Group-based parent-training programmes for improving emotional and behavioural adjustment in children from birth to three years old (Review)

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[Intervention Review]

Group-based parent-training programmes for improving emotional and behavioural adjustment in children from birth to three years old

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ABSTRACT

Background

Emotional and behavioural problems in children are common. Research suggests that parenting has an important role to play in helping children to become well-adjusted, and that the first few months and years are especially important. Parenting programmes may have a role to play in improving the emotional and behavioural adjustment of infants and toddlers. This review is applicable to parents and carers of children up to three years eleven months although some studies included children up to five years old.

Objectives

To:

a) establish whether group-based parenting programmes are effective in improving the emotional and behavioural adjustment of children three years of age or less (i.e. maximum mean age of 3 years 11 months);

b) assess the role of parenting programmes in the primary prevention of emotional and behavioural problems.

Search methods

We searched CENTRAL, MEDLINE, EMBASE, CINAHL, PsycINFO, Sociofile, Social Science Citation Index, ASSIA, National Research Register (NRR) and ERIC. The searches were originally run in 2000 and then updated in 2007/8.

Selection criteria

Randomised controlled trials of group-based parenting programmes that had used at least one standardised instrument to measure emotional and behavioural adjustment.

Data collection and analysis

The results for each outcome in each study have been presented, with 95% confidence intervals. Where appropriate the results have been combined in a meta-analysis using a random-effects model.

Main results

Eight studies were included in the review. There were sufficient data from six studies to combine the results in a meta-analysis for parent-reports and from three studies to combine the results for independent assessments of children's behaviour post-intervention. There was in addition, sufficient information from three studies to conduct a meta-analysis of both parent-report and independent follow-up data. Both parent-report (SMD -0.25; CI -0.45 to -0.06), and independent observations (SMD -0.54; CI -0.84 to -0.23) of children's behaviour produce significant results favouring the intervention group post-intervention. A meta-analysis of follow-up data indicates a significant result favouring the intervention group for parent-reports (SMD -0.28; CI -0.51 to -0.04) but a non-significant result favouring the intervention group for independent observations (SMD -0.19; CI -0.42, 0.05).

Authors' conclusions

The findings of this review provide some support for the use of group-based parenting programmes to improve the emotional and behavioural adjustment of children with a maximum mean age of three years eleven months. There is, insufficient evidence to reach firm conclusions regarding the role that such programmes might play in the primary prevention of such problems. There are also limited data available concerning the long-term effectiveness of these programmes. Further research is needed.

PLAIN LANGUAGE SUMMARY

Group-based parent-training programmes for improving emotional and behavioural adjustment in children age three and under

Parenting practices play a significant role in the development of emotional and behavioural problems in children, and parenting programmes aimed at the parents of infants and toddlers have the potential to prevent the occurrence of such problems. The findings of this review provide some support for the use of group-based parenting programmes to improve the emotional and behavioural adjustment of children with a maximum mean age of three years eleven months. The evidence concerning the long-term effects of improvements is inconclusive. It may be that during this period of rapid development, input at a later date is required. More research is needed to address this question.

BACKGROUND

Description of the condition

The epidemiology of child mental health problems

Emotional and behavioural problems are one of the most important causes of functional disability in children (Bone 1989). Their prevalence, using clinical criteria, has been estimated to be as high as 20% in urban areas (Campbell 1995), and they currently exceed present means and resources for dealing with them (DoH 1995). The rate of behaviour problems among preschoolers in particular is high. One study found a six-month prevalence of behavioural and emotional symptoms of 12.4% in a sample of 1,887 German preschool children (Furniss 2006). A study of a nationally representative sample of Turkish toddlers aged two to three years found 11.9% of the children in the clinically significant range using a measure of child behaviour, and 18.6% of the children in the borderline range (Erol 2005), and a study of UK reception class school children showed that between 15 and 21% exhibited emotional and behavioural problems (St James-Roberts 1994).

Emotional and behavioural problems in children have a high prevalence and predict an increased risk of a range of poor outcomes including depression, alcohol and drug misuse, and psycho-social problems such as poor work and marital outcomes, delinquency and criminal behaviour (Champion 1995; Farrington 1991; Farrington 1994; Kazdin 1990; Loeber 1997; Moffit 1996; Offord 1994; Robins 1990; Robins 1991; Rutter 1996). For example, the Dunedin study showed that antisocial behaviour at age 13 was predicted by externalising behaviour at age three and behaviour problems at age five (Robins 1991). A 22-year follow-up study showed that peer-rated aggression at age eight predicted the number of convictions by age 30, as well as the seriousness of the crimes (Eron 1990).

Description of the intervention

Parenting programmes

Parenting programmes are focused short-term interventions aimed at helping parents improve their relationship with their child, and preventing or treating a range of emotional and behavioural problems. The use of parents as modifiers of their children's behaviour began in the 1960s when it was shown that, using behaviour modification techniques, parents could successfully decrease tantrums, self-destructive behaviours, verbal aggression, excessive crying, thumbsucking, soiling, school phobia, speech dysfunction, seizures, oppositional behaviour and antisocial and immature behaviour (Johnson 1973; Rose 1974). This early work was conducted with individual families, and the use of groups did not begin until the 1970s. The expansion of group-based parenting programmes has taken place in a number of countries over the past few decades (Pugh 1994).

Parenting programmes are underpinned by a range of theoretical approaches (including: Behavioural, Family Systems, Adlerian, and Psychodynamic) and can involve the use of a range of techniques in their delivery including discussion; role play; watching video vignettes; and homework. They are typically offered to parents over the course of 8 to 12 weeks, for about one to two hours each week. They can be delivered on a one-to-one basis or to groups of parents, and are provided in a number of settings ranging from hospital/social work clinics to community-based settings such as GP surgeries, schools and churches. They typically involve the use of a manualised and standardised programme or curriculum, and are aimed at increasing the knowledge, skills and understanding of parents.

Parenting programmes are now being offered in a variety of settings, and recent NICE guidance supports their use with children aged 3 to 10 years with conduct/behaviour problems (Dretzke 2009; NICE 2006). Other reviews have demonstrated their effectiveness in improving maternal psychosocial health in the short term, including reducing anxiety and depression, and improving self-esteem (Barlow 2001), and meta-ethnographic evidence points to a range of benefits of taking part in a group with other parents (Kane 2007). It has also been suggested that group-based parenting programmes may be a more effective method of supporting parents of children with sleep problems than individually tailored behavioural programmes (Szyndler 1992).

How the intervention might work

Parenting and child mental health

The first three years of a child's life are particularly important in establishing later patterns of emotional, cognitive and social functioning, and parenting during this period has been identified as being one of the most important influences (Schore 1994). A number of recent studies have found significant associations between factors such as maternal sensitivity (Kemppinen 2007), disrupted maternal behaviour (Madigan 2006), deficits in the early caregiving environment (Shaw 2001), and preschool externalising (behaviour) problems. These results are consistent with attachment theories about the role of the early environment on infant security of attachment. This body of literature shows that during the first three years of life, infants are making emotional attachments and forming the first relationships which lay many of the foundations for future mental health (Bowlby 1998; Sroufe 1996; Steele 1996). Parenting that is provided during this period plays a crucial role in the infants evolving brain structures (Schore 1994), their developing capacity to regulate their emotions (Sroufe 2005; Schore 1994), and their developing security of attachment (Egeland 1993; Barrett 2006). Indeed, it has been suggested that attachment security and atypical attachment classifications, appear to be one of the most consistent predictors of child functioning, particularly in terms of emotional and behavioural adjustment (Vondara 2001). Insecure attachment has been shown to be related to a range of poor outcomes including behavioural problems (Sroufe 2005), anxiety (Warren 1997), dissociation (Ogawa 1997), and delinquency (Garnier 1998). The ability to empathise and to understand other people's thoughts and feelings is also related to the quality of the early parent-infant relationship, and it is recognised that deficits in these areas of functioning are associated with increased levels of violence and criminality (Velez 1989). In addition, there is a clear relationship between poor maternal-infant relationships and poor social development/insecure attachment (Atkinson 2000; Martens 2000), cognitive deficits (Murray 2003; Sorh-Preston 2006) including poor intellectual (Hay 2001) and educational achievement (Campbell 1995), criminality (Egeland 1993), and a range of mental health problems (Fonagy 1997).

There is also a significant body of research underpinned by social learning theory, addressing the relationship between early parenting practices and child functioning. Positive proactive parenting (involving praise, encouragement and affection) has been shown to be strongly associated with high child self-esteem and social and academic competence, and to be protective against later disruptive behaviour and substance misuse (Kumpfer 2004). Parenting practices characterised by harsh and inconsistent discipline, little positive parental involvement with the child, and poor monitoring and supervision, however, have been shown to be associated with an increased risk of a range of poor outcomes including delinquency and substance abuse (Patterson 1993). Indeed, parenting and family interaction variables have been shown to explain up to 30 to 40% of child antisocial behaviour (Patterson 1989).

This body of research suggests that early parenting is key to child emotional and behavioural functioning, and it has been suggested that the promotion of the mental health of infants is key to the prevention of mental disorders throughout the lifespan (Fonagy

1998). There is a consensus that early interventions designed to improve parent-infant interaction in particular, and parenting practices more generally, are key to promoting the well-being of children.

Why it is important to do this review

There has been no attempt to date to synthesize the evidence concerning the effectiveness of parenting programmes that are directed at infants and toddlers, (defined in this review as a maximum mean age of 3 years 11 months), and that have a different focus from interventions that are directed at older children (in the three to eight year age range). In addition, although most current evidence from controlled trials address the use of parenting programmes as part of secondary, high-risk approaches to prevention, it has been argued on theoretical grounds that they would be more effective if delivered as part of a population-based approach (Barlow 2003; Sanders 2008), in which they are offered to all parents with the aim of preventing problems before they occur, and promoting child health. Although at least one parenting programme has been designed and delivered as part of a population-based public-health approach (e.g. Triple P) (Prinz 2009; Sanders 2002; Sanders 2008), parenting programmes have typically been used to date in a secondary/tertiary preventive role i.e. the treatment of early mental health problems. It may be, however, that they have an important role to play in the primary prevention of mental health problems and the promotion of mental health. This review aims to address these issues.

OBJECTIVES

The objectives of this review are as follows:

a) to establish whether group-based parenting programmes are effective in improving the emotional and behavioural adjustment of children aged three years (maximum mean age of 3 years 11 months) or less;

b) to assess whether parenting programmes are effective in the primary prevention of emotional and behavioural problems.

METHODS

Criteria for considering studies for this review

Types of studies

Randomised controlled trials and quasi-randomised controlled trials;

Studies in which participants were randomly allocated to an experimental or a control group, the latter being a waiting-list, no-treatment (including treatment as usual or normal service provision) or a placebo control group;

We included quasi-randomised controlled trials, defined as trials where allocation was conducted on the basis of a pseudo-random sequence, e.g. odd/even hospital number or date of birth, alternation (Higgins 2008). We identified these in the 'risk of bias' table to distinguish them from more formally randomised trials.

Studies comparing two different therapeutic modality groups, but without a control group were not included in the review.

Types of participants

Studies were eligible for inclusion in the review if they targeted parents (or any adult defined as a primary carer including mothers, fathers, foster parents, grandparents or relatives) of children from birth to three years (including studies in which the maximum *mean* age of the children is 3 years and 11 months), with or without emotional or behavioural problems, i.e. the programme is aimed either at treating existing emotional or behavioural problems, or preventing the development of such problems). Studies involving parents of a child older than three years of age were included providing that the maximum mean age of all the children in that study was 3 years and 11 months. This reflects the fact that whilst this review focuses on interventions that are developmentally appropriate for children from birth to three years, a number of studies evaluating relevant interventions may well have included children who are slightly older than this (i.e. up to five years) in addition to younger children. Studies were excluded where they targeted parents of children above the age of three years or in which the mean age of the sample was greater than 3 years and 11 months. We also excluded studies that focused on specific conditions other than emotional and behavioural problems (e.g. physical disabilities; autism etc.).

Types of interventions

Studies evaluating the effectiveness of any group-based parenting programme were eligible for inclusion irrespective of the theoretical basis underpinning the programme (i.e. behavioural, cognitive behavioural, humanistic etc. were all eligible for inclusion).

Types of outcome measures

Primary outcomes

Emotional and behavioural adjustment

Child emotional and behavioural adjustment, measured using a standardised instrument, such as: Eyberg Child Behaviour Inventory (ECBI), the Behaviour Screening Questionnaire (BSQ), the Child Behaviour Questionnaire (CBQ) or the Dyadic Parent-Child Interaction Coding System (DPICS).

Secondary outcomes

No secondary outcomes were assessed.

Search methods for identification of studies

Electronic searches

We searched the following electronic databases for reports of trials. An RCT filter was not used to ensure that the search was as inclusive as possible, and no language or date restrictions were applied. The searches were originally run in 2000 (please see Appendix 1) and then updated in 2007/8. The search strategies used for each database can be found in Appendix 2.

- Cochrane Library (CENTRAL) 2007 (Issue 4)
- MEDLINE 1970 to Nov 2007
- EMABSE 1974 to 2007 week 48
- BIOSIS 1985 to Nov 2007
- National Research Record (NRR) - 2007 (Issue 4)
- ERIC 1966 to Nov 2007
- Social Science Citation Index (SSCI) 1994 to Nov 2007
- ASSIA 1987 to Nov 2007
- Sociological Abstracts 1994 to Nov 2007
- PsycINFO 1970 to 2007/11 week 5
- CINAHL 1982 to Nov week 5 2007
- British Nursing Index 1994 to May 2008
- Dissertation Abstracts 1980 to May 2008

We did not exclude non-English language publications.

Searching other resources

We contacted trial investigators for further information if details of trial conditions were needed.

Data collection and analysis

Selection of studies

Titles and abstracts of studies identified through searches of electronic databases were reviewed to determine whether they met the inclusion criteria. For the previous published versions of this review, titles and abstracts were identified by JP and read and reviewed by JP and JB. Two authors (JP and JB) independently assessed full copies of papers that appeared to meet the inclusion criteria. Two reviewers (NS and MF) carried out this process for the purpose of the updated review in 2009; any uncertainties were resolved by JB.

Data extraction and management

Data were extracted independently by two authors using a data extraction form and entered into RevMan. Where data were not available in the published trial reports, authors were contacted to supply missing information. One author provided missing data (Sutton 1992).

The following data were extracted:

Study procedures

1. Recruitment
2. Duration
3. Setting

Study methods

1. Study design (e.g. randomised or quasi-randomised)
2. Randomisation method (including list generation)
3. Method of allocation concealment
4. Blinding participants
5. Blinding of investigators
6. Blinding of outcome assessors
7. Unit of allocation

Participants

1. Inclusion/exclusion criteria
2. Number (total/per group)
3. Age distribution
4. Gender
5. Other demographic data including baseline characteristics

Description of intervention

1. Intervention conditions
2. Duration

Follow-up data

1. Duration of follow-up
2. Loss to follow-up

Outcomes

1. Prospectively stated
2. Incomplete

We have reported which scales and subscales were used for each study in the Effects of interventions section.

Analysis data

1. Methods of analysis (intention-to-treat/per-protocol analysis)
2. Comparability of groups at baseline (yes/no)

Data were entered into Review Manager 5 (RevMan 2008) by one author (NS) and then checked by the second author (MF).

Assessment of risk of bias in included studies

In the previous published version of this review, the included studies were critically appraised by JB and JP using a number of criteria including the method of allocation concealment and the numbers of participants in each group, the method of dealing with attrition/drop-outs, blinding, and whether there was any assessment of the distribution of confounders.

In the updated version of the review, the review authors (NS, MF and HJ) independently assessed the risk of bias within each included study based on the following six domains with ratings of 'Yes' (low risk of bias); 'No' (high risk of bias) and 'Unclear' (uncertain risk of bias) (Higgins 2008); please see 'Characteristics of included studies':

Sequence generation

The method used to generate the allocation sequence was assessed to determine if it produced comparable groups using the following rating system: 'Yes' (low risk of bias); 'No' (high risk of bias) and 'Unclear' (uncertain risk of bias).

Allocation concealment

The method used to conceal allocation sequence was assessed to see whether it was adequate in terms of whether the intervention schedules could have been foreseen in advance of, or during, recruitment using the following rating system: 'Yes' (low risk of bias); 'No' (high risk of bias) and 'Unclear' (uncertain risk of bias).

Blinding

An assessment was made as to whether any steps were taken to blind participants, personnel and outcome assessors to which intervention a given participant might have received using the following rating system: 'Yes' (low risk of bias); 'No' (high risk of bias) and 'Unclear' (uncertain risk of bias).

Incomplete outcome data

Where studies did not report intention-to-treat analyses, attempts were made to obtain missing data by contacting the study authors. We assessed whether incomplete data was dealt with adequately by the reviewers, and how data on attrition and exclusions were reported, compared with the total randomised using the following rating system: 'Yes' (low risk of bias); 'No' (high risk of bias) and 'Unclear' (uncertain risk of bias).

Selective outcome reporting

We assessed whether any attempt had been made to reduce the possibility of selective outcome reporting by investigators using the following rating system: 'Yes' (low risk of bias); 'No' (high risk of bias) and 'Unclear' (uncertain risk of bias).

Other sources of bias

We assessed whether the study was apparently free of other problems that could put it at a high risk of bias.

Measures of treatment effect

Data from continuous outcomes that were measured using similar but not identical instruments were analysed using standardised mean differences. All analyses included all participants in the treatment groups to which they were allocated, whenever possible.

Subgroup analysis and investigation of heterogeneity

We carried out subgroup meta-analysis of the outcome measurements by rating scale used, to examine the effect of including studies with a high risk of bias.

Unit of analysis issues

Data from cluster randomised trials were combined with individually randomised trials in the same meta-analysis. None of the included studies involved cross-over randomisation.

Dealing with missing data

Missing data and drop-outs/attrition were assessed for each included study and reported in the risk of bias tables (Characteristics of included studies). In some cases, authors were contacted to supply data missing from included studies.

Assessment of heterogeneity

Clinical heterogeneity was assessed by comparing the distribution of important participant factors between trials (e.g. age), and trial factors (randomisation concealment, blinding of outcome assessment, losses to follow-up, treatment type, co-interventions). Statistical heterogeneity was assessed by examining I^2 (Higgins 2002), a quantity which describes approximately the proportion of variation in point estimates that is due to heterogeneity rather than sampling error. In addition, a chi^2 test of homogeneity was employed to determine the strength of evidence for heterogeneity.

Assessment of reporting biases

Funnel plots (estimated differences in treatment effects against their standard error) were drawn. Asymmetry can be due to publication bias, but can also be due to a real relationship between trial size and effect size.

Data synthesis

The studies included in this review used a range of scales to measure similar outcomes e.g. children's behavioural adjustment was measured using the Eyberg Child Behaviour Inventory (ECBI), the Child Behaviour Questionnaire (CBQ), the Behaviour Screening Questionnaire (BSQ), the Pediatric Symptom Checklist (PSC) and the Home Situations Questionnaire (HSQ). The treatment effect for each outcome in each study was therefore standardised by dividing the mean difference in post-intervention scores for the intervention and treatment group, by the pooled standard deviation, to obtain an effect size. Where appropriate the results were combined in a meta-analysis using a random-effects model. The decision about whether to combine data in this way was determined by the level of heterogeneity present in the population, intervention, and outcomes being used in the primary studies. Where there was an insufficient number of outcomes to justify combining them in a meta-analysis, the effect sizes and 95% confidence intervals for individual outcomes in individual studies have been presented.

Subgroup analysis and investigation of heterogeneity

Subgroup analysis was conducted to explore whether longer programmes (i.e. eight weeks or more) or primary preventive programmes were more effective.

Sensitivity analysis

Sensitivity analyses were conducted for the updated review to test if the findings of the meta analyses were robust, by examining the effect of variables between the studies, such as older participants, RCTs and quasi-RCTs, risk of bias.

RESULTS

Description of studies

See: Characteristics of included studies; Characteristics of excluded studies.

Results of the search

The updated searches, in January 2008, identified 2464 additional records.

Two reviewers (NS and MF) independently examined the titles and abstracts. The majority of articles reviewed were written in English. All articles in languages other than English had abstracts in English, and these studies were all excluded on the basis of information contained in the abstracts. Sixty one records were identified as being of possible eligibility, and for which a full copy was obtained.

Included studies

The results of updated searches run in 2008 produced 61 papers for potential inclusion (i.e. by matching details in the abstract against the inclusion criteria). An examination of the full text of these 61 papers, resulted in 57 being excluded (see Characteristics of excluded studies).

Of these, 61 papers were identified by abstract screening against inclusion criteria. After reading the full text of these 61 papers, 57 reports of studies were excluded. Of the remaining 4 reports of trials, Jones 2007 was a secondary publication arising from the Hutchings 2007 trial, and reports on a subgroup of 79 parents whose child showed signs of both early-onset externalising problems and hyperactivity. However, results from these participants were included in Hutchings 2007. Therefore three new papers (Bradley 2003; Cummings 2000; Hutchings 2007) were added to the five previously included studies (Gross 1995; Gross 2003; Nicholson 1998; Nicholson 2002; Sutton 1992).

The eight included studies produced a total of 50 comparisons (27 post-intervention and 23 follow-up) of group-based parent-training programmes versus a waiting-list control condition.

There were some important differences between the studies. We summarise these differences and the main study characteristics below. Further details are provided in the Characteristics of included studies table.

Design

All eight included studies compared group-based parenting programmes with a waiting-list control group. Two studies, however, utilised more than one intervention group (Gross 2003; Sutton 1992).

Sutton 1992 comprised a quasi-randomised design in which participants were sequentially allocated to one of four study conditions. Eleven families who were initially randomised to WLC group were reallocated to the intervention group. Gross 2003 comprised a cluster randomised design using the grouped centres as the unit of allocation. Eleven centres were matched on variables such as day-care size, ethnic composition, day-care centre quality, etc., and then randomly assigned to four study conditions. Hutchings 2007 used block-randomisation with allocation by area on a 2:1

basis after participants were stratified by sex and age, and Bradley 2003 allocated caregivers in blocks of 6 and 10 to either the immediate intervention or a wait-list control condition. Nicholson 2002 randomly allocated individual families to an intervention or control group.

The remaining two studies used less rigorous methods of allocation (Cummings 2000; Nicholson 1998) but only one of these provided sufficient data for the purpose of meta-analysis and its overall impact on the results was therefore assessed using a sensitivity analysis (Nicholson 1998). Nicholson 1998 allocated some parents on the basis of the night that they were able to attend the programme (e.g. one night included the parent-education group, and the second night included the WLC group). Only participants with no preferences were randomised to the two study conditions: remaining families were allocated on the basis of preference. The influence of this study on the overall results is discussed later.

Cummings 2000 reports that 37 parents participated in the study, but only 31 participants were randomised to the intervention (n= 15) or the control (n=16) condition. Six of the parents who first participated in the WLC group, participated later in the intervention group and were therefore double counted. This study has not been included in meta-analyses because of a lack of data.

Sample sizes

There was considerable variation in sample size between studies. Overall, the number of participants (primary carer and index child pair) initially randomised per study ranged from 24 to 264. All studies apart from Cummings 2000 reported the number of participants completing and this ranged from 16 to 208. The distribution of sample size across the studies was uneven. Three large multicentre trials (Bradley 2003; Gross 2003; Hutchings 2007) randomised 264, 222 and 153 respectively. The remaining five studies involved forty or less participants with sample sizes ranging from 24 to 40. In two studies (Cummings 2000; Sutton 1992) some participants were included in the analysis twice (i.e. once as a control case and again as an intervention case (see above).

Setting

Five studies were conducted in the USA (Cummings 2000; Gross 1995; Gross 2003; Nicholson 1998; Nicholson 2002), two in the UK (Hutchings 2007; Sutton 1992), and one in Canada (Bradley 2003). Three studies were multi-centre trials (Bradley 2003; Gross 2003; Hutchings 2007), two were single-centre trials (Gross 1995; Nicholson 1998), and three did not provide sufficient information to be classified (Cummings 2000; Nicholson 2002; Sutton 1992).

The trials were mostly conducted in community settings: Bradley 2003 delivered the intervention in collaborating community agencies; Cummings 2000 was conducted in community-based agencies, but did not report the exact setting of the study; and one study was set in an urban medical centre in addition to a number of community settings although no further details about the setting were given (Gross 1995). Gross 2003 was conducted in day-care centres, and delivered at multiple sites in an urban area, and Hutchings 2007 was community-based, involving multiple sites in rural North and Mid Wales (UK). Nicholson 1998 comprised a single site, suburban community-based intervention in Wisconsin (USA) and Nicholson 2002 comprised a single site, urban community-based intervention in the same city; Sutton 1992 was delivered in a community-based setting in urban Leicester (UK).

Participants

Participants comprised primary carer-index child pairs. The target primary carers were predominantly mothers or fathers, or both. In addition, two studies (Gross 2003; Nicholson 2002) involved foster parents, and/or grandparents or other relatives as the primary carer. Three studies recruited children without emotional and behavioural problems (Gross 2003; Nicholson 1998; Nicholson 2002), one of which recruited parents who were deemed to be 'at risk' on the basis of their frequent use of verbal and corporal punishment (Nicholson 2002). Nicholson 2002 recruited from low income and Nicholson 1998 from community samples.

Five studies (Bradley 2003; Cummings 2000; Gross 1995; Hutchings 2007; Sutton 1992) recruited children experiencing emotional or behavioural difficulties such as conduct problems, hostile/aggressive behaviour, self-destructive behaviour, or hyperactivity. Bradley 2003 recruited preschoolers with behavioural problems. Gross 1995 included parents of children meeting the criteria for behavioural difficulty as measured by the Eyberg Behaviour Intensity Scale or the Toddler Temperament Scale. Hutchings 2007 also recruited children scoring above the clinical cut-off on either the Eyberg Problem or Intensity scale. Sutton 1992 recruited children described as exhibiting 'difficult' behaviour, but provided no further criteria. Cummings 2000 did not provide detail about the use of eligibility criteria to select participants, but described the programme as being aimed at addressing children's negative behaviours including sleep problems and toiletting.

There were considerable gender differences between the studies. In total 498 mothers, 63 fathers, 11 grandparents or other relatives, and 4 foster parents were involved in five studies (Bradley 2003; Gross 1995; Gross 2003; Nicholson 1998; Nicholson 2002). One study (Gross 1995) involved both parents. Cummings 2000, Hutchings 2007 and Sutton 1992 did not provide information about the relationship of the participants to the child, carer age or gender. The age-range of target parents was between 27 years and mid-thirties in four studies (Bradley 2003; Gross 1995; Nicholson 1998; Nicholson 2002). The gender of the children was reported in seven studies, and almost two thirds of children were boys (n= 305 boys; n=175 girls). One study (Gross 2003) did not report the gender of the target child.

Although most studies included children from birth to three years,

a number of studies included some older children (up to five years of age), and were thereby included provided that the maximum mean age of children in the study was no greater than 3 years 11 months. Further details of the participant ages are given in Characteristics of included studies.

Interventions

Specific details of the content of each programme can be seen in Table 1.

Four studies examined the effectiveness of programmes aimed at the primary/secondary prevention of emotional and behavioural problems (Cummings 2000; Gross 2003; Nicholson 1998; Nicholson 2002;). Four studies (Bradley 2003; Gross 1995; Hutchings 2007; Sutton 1992) evaluated the effectiveness of parenting programmes targeted at 'difficult' children or children with existing problems (tertiary prevention). Hutchings 2007 recruited children who scored above the clinical cut-off on either the Eyberg problem or intensity scale.

All group-based parenting programmes were compared to a WLC condition as part of the evaluation of their effectiveness in improving the emotional and behavioural adjustment of infants and toddlers. In two studies (Gross 2003; Sutton 1992) the intervention programmes were compared to additional study conditions: a parent plus teachers condition (Gross 2003) and a home visiting condition (Sutton 1992), neither of which are reported here. Three of the included studies (Gross 1995; Gross 2003; Hutchings 2007) involved an evaluation of the Incredible Years Basic Parenting Programme (Incredible Years 2009). The programme consists of a series of brief videotaped vignettes of parents and children engaging in a variety of typical family situations. Bradley 2003 evaluated the effectiveness of a video-tape modelling group-based parent training (1-2-3 Magic video-group based training) consisting of a two-hour group meeting once a week for three weeks, followed by a booster session four weeks after the third session. Cummings 2000 combined the use of video material with other educational material as part of a psycho-educational behaviour programme that was delivered in one and a half hour sessions over the course of six weeks. Sutton 1992 evaluated the effectiveness of a behavioural parenting programme that was delivered over the course of eight weeks. Two studies evaluated the cognitive-behavioural STAR programme (Stop Think Ask Respond), which was delivered over three weekly two-hour sessions followed by a booster session one month later (Nicholson 1998; Nicholson 2002).

The duration of the interventions ranged between 4 and 12 weeks (mean nine weeks; median nine weeks).

Outcomes

Primary outcomes

An overview of the findings reported in Bradley 2003; Cummings 2000; Gross 1995; Gross 2003; Hutchings 2007; Nicholson 1998; Nicholson 2002 and Sutton 1992 is provided in Table 2. A range of scales (n=18), subscales and revised scales were reported by the trial investigators and the table has been organised into the following three categories:

1. child problematic behaviour;
2. parent-child interaction; and
3. child cognitive development.

All of the studies, except Cummings 2000, reported child problematic behaviour. Cummings 2000 focused on parent/child interaction and child cognitive development. Parent/child interaction was also reported in three further studies (Gross 1995; Gross 2003; Hutchings 2007). Two studies (Bradley 2003; Gross 1995) reported child temperament.

In all studies except one (Hutchings 2007), the outcomes were assessed at baseline, post-intervention, and follow-up. In the Hutchings 2007 study the outcomes were only assessed at baseline, and at six-months follow-up. Hutchings 2007 reports only baseline and follow-up data (i.e. no post-intervention data are reported. Bradley 2003 only evaluates a subset of 25 families in the intervention group at follow-up.

The follow-up period ranged from 4 weeks to between 12 and 18 months. In three studies (Bradley 2003; Gross 2003; Sutton 1992) the follow-up period was 12 months or longer.

Excluded studies

After assessing studies retrieved by the updated searches in 2008, we excluded 57 newly retrieved potential RCT studies by screening the titles and abstracts against the inclusion criteria. Twenty-one of these 57 excluded studies did not fit the inclusion criteria for the following reasons: seven studies were not an RCT; in 13 studies children were too old (five years or older); one study was a report of a pilot study for a randomised controlled trial, but did not involve the use of a group-based intervention. As a result of the fact that these studies did not meet the inclusion criteria, no further information was recorded and they do not appear in the excluded studies table. The remaining 36 studies, which appeared to meet the eligibility criteria, but which were excluded after reviewing the full text, are listed in 'Characteristics of excluded studies' table, along with studies that were excluded in the previous published versions of the review.

Risk of bias in included studies

The 'risk of bias' table provides a summary of our assessment of this for the eight included studies (see Characteristics of included studies).

Allocation

The method of sequence generation was only described in one study (Hutchings 2007). One study used an unreliable method of allocating some participants to groups (i.e. parent preference and availability) (Nicholson 1998, see Included studies) and sensitivity analyses have therefore been conducted to assess the impact of this study.

Blinding

In trials of parenting programmes, it is not possible to blind either facilitators or parents to the type of treatment being implemented or received. One of the methods of minimising bias arising from failure to blind participants and study personnel is to blind assessors of clinical outcomes. Only one study reported that assessors for all outcomes were blinded (Hutchings 2007). Two studies (Gross 1995; Gross 2003) reported that assessors of observational outcomes were blinded. However, it was not clear whether assessors who assessed outcomes reported by parents were blinded. In one study (Cummings 2000) it was not possible to blind the assessor because they were sole investigators. The four remaining studies (Bradley 2003; Nicholson 1998; Nicholson 2002; Sutton 1992) did not report whether assessors were blinded or not.

Incomplete outcome data

There were no missing outcome data in one study (Nicholson 1998). None of the participating families dropped out of the study and it would appear that all participants remained in the group to which they were allocated. Two studies (Gross 2003; Hutchings 2007) adequately addressed incomplete data. In the Gross 2003 study the drop-out rate in the parent-training condition was in the region of 30%. Intention-to-treat analysis was not conducted but the effects of dropouts on the results of the analyses were assessed and it is concluded that participant attrition did not modify the results. Hutchings 2007 reported the reasons for missing data (27% in intervention group and 4% in control group), and an intention-to-treat analysis was performed.

Outcome data were not adequately addressed in two studies (Cummings 2000; Nicholson 2002). The results reported in Cummings 2000 suggest that analyses were performed on completers only, and no information was given about attrition and missing outcomes. The Nicholson 2002 study reports a 10% drop-out rate, but does not describe whether these parents were included in the analyses or from which group they dropped out.

The remaining three studies (Bradley 2003; Gross 1995; Sutton 1992) did not report sufficient information about incomplete data. Although Bradley 2003 reports that data were analysed using an intention-to-treat analysis, it appears that the post-test sample comprised only completers (n=174). No further information was given about missing data for 24 participants. In the Sutton 1992 study only two families dropped out, but it was not clear whether the data from these families were included in the analyses.

Selective reporting

Bradley 2003 reported only the results that were statistically significant (i.e. only two out of four scales of the pre-school behaviour questionnaire (PBQ) are reported - total score and hyperactive/distractible subscale score). No indications of reporting bias were apparent in the remaining seven studies.

Other potential sources of bias

Distribution of confounders

While the use of randomisation should, in theory, ensure that any possible confounders are equally distributed between the arms of the trial, the randomisation of small numbers of parents may result in an unequal distribution of confounding factors. It is therefore important that the distribution of known potential confounders is: i) compared between the different study groups at the outset; or ii) adjusted for at the analysis stage. In the Sutton 1992 study there were no differences in the main assessment measures pre-intervention. However, no information was provided about other known confounders such as the age of the participating parents and their children, or their socio-economic status. The Nicholson 1998 study did not provide pre-intervention data concerning child behaviour, but showed that the intervention and control groups were similar in terms of the child's age, and number of parents in each group. However, Bradley 2003 reported that there were no differences between the experimental and the control group regarding the age of parents, age of child, intactness of family, and level of education. In addition, the study groups did not differ at baseline in any of the measures, and therefore could be considered to be equivalent. Hutchings 2007 also reported that the mean assessment measures and demographic scores were similar at baseline for the two groups. In the study in which day care centres were the unit of allocation, centres were matched on a number of variables including day care size, ethnic composition, percentage of single parent families, median income and day care centre quality (Gross 2003). Three studies provided no description of the known confounding factors (Cummings 2000; Gross 1995; Nicholson 2002).

Additional sources of bias

Cummings 2000 provides inadequate information to make an assessment about the reliability of many aspects of the study and may as such include additional sources of bias, and one study reports a conflict of interest in terms of the principal investigator (Hutchings 2007). No other sources of bias were noted in any of the included studies.

Effects of interventions

The findings of the included studies, reported in the Data and analyses tables, comprise the following:

- Section A: Individual study results for emotional and behavioural adjustment data post-intervention;
- Section B: Individual study results for emotional and behavioural adjustment data at follow-up;
- Section C: Meta-analysis of the emotional and behavioural adjustment data post-intervention;
- Section D: Meta-analysis of the emotional and behavioural adjustment at follow-up data.

The results are presented as effect sizes with 95% confidence intervals and a minus sign indicates that the results favour the intervention group. The post-intervention scores and follow-up scores have been used to calculate effect sizes rather than change scores (i.e. pre to post scores for each group). This reflects the fact that a change standard deviation is required to calculate change scores, and these data were not available for any of the included studies. Effect sizes smaller than 0.2 are treated as no evidence of effectiveness.

Eight of the studies included in this review assessed the effectiveness of group-based parenting programme in improving emotional and behavioural adjustment in children from birth to three years. Nicholson 1998 and Nicholson 2002 evaluated cognitive behavioural programmes. The remaining six studies assessed behavioural programmes. All comparisons were between parenting programmes and waiting-list control groups. A number of validated scales were used to measure emotional and behavioural adjustment.

A summary of the main findings on the effects of the interventions studied in the review

Section A: Individual study results for emotional and behavioural adjustment outcome for post intervention data

Overall, twenty seven outcome measurements were obtained from six studies. In Hutchings 2007 no post intervention assessment was carried out nor were any post intervention data reported. Cummings 2000 was also not included because means were reported as percentages (n.b. these showed non-significant results for compliance (P=0.09), non-compliance (P=0.09) and deviant behaviours (P=0.73).

It should be noted that Gross 2003 did not report the attrition rate of participants by the group to which they were randomised, therefore the analyses for these study are based on the initial participant numbers for each group at each time point.

The results for 6 of the 27 outcome measurements from four studies showed significant differences favouring the intervention group. These were as follows: Bradley 2003 - PCQ (Difficult): -0.30 (-0.60, -0.00; Analysis 1.1); Gross 2003 - teacher-reported classroom behaviour (KPC scale): -0.46 (-0.80, -0.11; Analysis 1.1), and independent observations of child negative behaviour using DPICS-R: -0.51 (-0.86, -0.17; Analysis 1.1); Nicholson 1998 - Behaviour Screening Questionnaire (BSQ): -0.79 (-1.44, -0.14; Analysis 1.1); Sutton 1992 -the Child Behaviour Questionnaire (CBQ): -1.51 (-2.57, -0.46; Analysis 1.1) and the Home Situations Questionnaire (HSQ): -1.34 (-2.37, -0.31; Analysis 1.1).

Seventeen results showed non-significant findings favouring the intervention group.

Three of the 27 results showed significant or non-significant results favouring the control group - Gross 2003 ECBI (Oppositional subscale) 0.21 (-0.14, 0.55; Analysis 1.1); and Gross 1995 ECBI-I (Mother report) 0.40 (-0.60, 1.41; Analysis 1.1) and DPICS - Child negative behaviour: Father report 0.24 (-0.76; 1.24; Analysis 1.1.

Section B: Individual study results for emotional and behavioural adjustment outcome for follow up data

Overall, 23 follow-up assessments were obtained from 3 studies that evaluated the effectiveness of the Webster-Stratton (1987) Incredible Years Basic Parenting Programme at one-year (Gross 2003); six-months (Hutchings 2007) and three-months (Gross 1995). One study provided no follow-up data (Cummings 2000); one study did not report data for the waiting-list control group due to the fact that by follow-up they had received the intervention (Sutton 1992), and a further study combined the data from the intervention group and the waiting-list control group once the latter had received the intervention (Nicholson 2002). The remaining two studies did not perform any follow-up assessment for the control group (Bradley 2003; Nicholson 1998).

The data for 7 of the 23 assessments indicate a significant result favouring the intervention group at follow-up; nine showed non-significant results favouring the intervention group; and the remaining seven were non-significant results favouring the control group. These were as follows:

Gross 2003 found a significant improvement at one-year in teacher-reported classroom behaviour (KPC scale): -0.66 (-1.01, -0.31; Analysis 2.1). Five results produced non-significant findings favouring the intervention group: ECBI - Intensity -0.23 (-0.57, 0.11; Analysis 2.1); ECBI Total:-0.18 (-0.52, 0.17; Analysis 2.1); ECBI Oppositional: -0.16 (-0.51, 0.18; Analysis 2.1); ECBI Inattentive: -0.29 (-0.63; 0.05; Analysis 2.1); ESCBI Conduct: -0.17 (-0.51, 0.17; Analysis 2.1). One result showed a non-significant difference favouring the intervention group: DPICS - Child negative behaviour (observer rated): -0.15 (-0.49, 0.19; Analysis 2.1).

Hutchings 2007 found a significant result at three-month follow-up in six out of eight assessments ECBI-Problem -0.45 (-0.80, -

0.11; Analysis 2.1); ECBI-Intensity -0.63 (-.0.97, -0.28; Analysis 2.1); Conners-Hyperactivity -0.50 (-0.85, -0.16; Analysis 2.1); Kendal-Self Control -0.38 (-0.72; -0.04; Analysis 2.1); SDQ Hyperactivity -0.55 (-0.90, -0.21; Analysis 2.1); SDQ-Total Child Deviance -0.35 (-0.70, -0.01; Analysis 2.1). The remaining two outcome measurements (SDQ-Problem and DPICS Child deviance) showed a non-significant difference favouring the intervention group.

At three-month follow-up Gross 1995 found four non-significant results out of a total of eight assessments favouring the intervention group - Toddler Temperament Scale: mother-report: -0.92 (-1.98, 0.13; Analysis 2.1 and father-report: -0.63 (1.66, 0.39; Analysis 2.1); DPICS-Child negative behaviour:mother report -0.95 (-2.01, 0.11; Analysis 2.1; and father-report -0.02 (-0.98, 1.01; Analysis 2.1). The remaining four results showed non-significant findings favouring the control group: ECBI-Intensity: mother- report 0.35 (-0.66, 1.35; Analysis 2.1) and father-report: 0.35 (-0.66, 1.35; Analysis 2.1); ECBI Problems - mother-report: 0.34 (-0.67, 1.34: Analysis 2.1; and father-report: 0.14 (-0.85, 1.14; Analysis 2.1.

Section C: Meta-analysis of the emotional and behavioural adjustment outcome for post-intervention data

Meta-analyses were conducted using data from the following outcomes:

1. parent reports; and
2. independent observations of children's behaviour.

1. Parent reports

Six studies (Bradley 2003; Gross 1995; Gross 2003; Nicholson 1998; Nicholson 2002; Sutton 1992) measured the effectiveness of a parenting programme in improving emotional and behavioural outcomes in infants/toddlers using standardised parent-report instruments including the Preschool Behaviour Questionnaire (PBQ), the Eyberg Child Behaviour Inventory (ECBI), the Behaviour Screening Questionnaire (BSC), and the Child Behaviour Questionnaire (CBQ). The six studies provided a total of 21 post-intervention assessments of parent-reports of children's emotional and behavioural adjustment but only six of these were included in the meta-analysis due to the fact that the remaining 15 were repeat measurements on the same children. The included outcome measures were selected using the following criteria: mother reports were favoured over father reports due to the fact that this is a more common way of assessing children's behaviour. The ECBI was favoured over the Toddler Temperament Scale (TTS) in the Gross 1995 study because the former is a more commonly used measure of children's behavioural adjustment. For the same reason, the CBQ was favoured over the Home Situations Questionnaire in the Sutton 1992 study. The Preschool Behaviour Questionnaire (PBQ) was favoured over the Preschool Characteristics Questionnaire (PCQ) in the Bradley 2003 study because the total score was available from the former instrument, while the latter provided the results for three subscales. Nicholson 2002 used two outcome measures, BSQ and ECBI, which had both been used in other included studies. However, both outcomes measures could not be included in the same meta-analysis because participants would be double counted and we therefore did a sensitivity analysis replacing the BSQ (Analysis 3.1) with the ECBI-Intensity (Analysis 3.2). The ECBI outcome measure comprises two subscales (ECBI-Intensity and ECBI-Problem subscales) which were used in three studies (Gross 1995; Gross 2003; Nicholson 2002). We conducted a subgroup analysis to assess the impact of using the two different measures (ECBI Intensity (Analysis 3.2) and ECBI Problem) (Analysis 3.3). We also conducted two sensitivity analyses to assess the impact of study duration by removing Bradley 2003, which was the only intervention of less than 10 weeks duration (Analysis 3.1 and Analysis 3.2). We carried out two further subgroup analyses to assess whether the focus of the programme influenced effectiveness: three studies that included community (Nicholson 1998) or at-risk populations (Gross 2003; Nicholson 2002) evaluated secondary interventions (Analysis 3.3); three studies evaluated tertiary interventions with children identified as having behaviour problems (Bradley 2003; Gross 1995; Sutton 1992) (Analysis 3.3).

The six studies provide data from a total of 410 participants (208 intervention group and 202 control group). The overall effect for the meta-analysis using the BSQ from Nicholson 2002 was: (SMD -0.25; 95% CI -0.45 to -0.06; Analysis 3.1), P=0.01. However, the I^2 statistic, which measures heterogeneity was 60% (P=0.03) indicating that there may be heterogeneity between studies. Substituting the ECBI-Intensity score for the BSQ score for Nicholson 2002 decreased slightly the significance of the treatment effect size (SMD -0.22; 95% CI -0.42 to -0.03; Analysis 3.2), P=0.03, with an I^2 statistic of 57%, P=0.04.

We also conducted a sensitivity analysis to assess the impact of study quality. Nicholson 1998 was omitted because randomisation was compromised (only participants with no preferences for a particular day for attending the intervention were randomised). The overall effect for this sensitivity analysis (using the BSQ from Nicholson 2002) was: (SMD -0.20; 95% CI -0.40 to 0.01; Analysis 3.1), P=0.06, I^2 statistic: 59%, (P=0.05). The removal of this study resulted in a loss of significance. However, the removal of Bradley 2003 resulted in a significant difference favouring the intervention group (SMD -0.36; 95% CI -0.62 to -0.10; Analysis 3.1 P=0.008, I^2 statistic: 64%, (P=0.02).

Subgroup analysis using the ECBI-Problem scales instead of ECBI-Intensity scales produced an overall effect of: SMD -0.20; 95% CI -0.40 to -0.01; Analysis 3.3), P=0.04, indicating a small significant difference favouring the intervention group with a high significant level of heterogeneity between studies I^2 statistic: 54%, (P=0.05).

Three of the studies including a total of 200 parents (108 inter-

vention group and 92 control group) evaluated the effectiveness of a parenting programme in the primary prevention of problems (Gross 2003; Nicholson 1998; Nicholson 2002) and the results indicated a small non-significant difference favouring the intervention group (SMD -0.21; 95% CI -0.49 to 0.07; Analysis 3.3), P=0.15, I^2 statistic: 56%, (P=0.15).

Three of the studies including a total of 210 parents (100 intervention group and 110 control group) evaluated the effectiveness of a parenting programme in the secondary/tertiary prevention of behaviour problems (Bradley 2003; Gross 1995; Sutton 1992) and the results evidenced a small non-significant difference favouring the intervention group (SMD -0.20; 95% CI -0.48 to 0.07; Analysis 3.3), P=0.15, I^2 statistic: 69% (P=0.04).

2. Independent observations

Three studies measured the effectiveness of a parenting programme in improving emotional and behavioural outcomes in infants/toddlers using standardised independent observations of children's behaviour (Gross 1995; Gross 2003; Nicholson 2002). These included the Pediatric Symptom Checklist teacher-report, Sutter-Eyberg Behaviour Inventory teacher-report, the Kohn Pediatric Checklist (KPC) teacher-report, and independent observations of parent-child interaction - Dyadic Parent-Child Checklist (DPICS). The three studies provided a total of six assessments of outcome, but only three of these were included in the meta-analysis due to the fact that the remaining three were repeat measures on the same children. The three outcome measures were selected by prioritising observations of mothers rather than observations of fathers. Where more than one teacher-report was available, a summary measure was selected i.e. in the Nicholson 2002 study three teacher reports were available - the Sutter-Eyberg Intensity, Sutter-Eyberg Problems and the Pediatric Symptom Checklist - the latter was therefore selected for inclusion.

The three studies provide data from a total of 177 participants (99 intervention group and 78 control group). The combined data indicate a significant difference favouring the intervention group (SMD -0.54; 95% CI -0.84 to -0.23; Analysis 3.4), P = 0.0005. There was no heterogeneity between the studies: the I^2 statistic was 0%, (P=0.96).

Section D: Meta-analysis of the emotional and behavioural adjustment outcome for follow-up data

Meta-analyses were conducted using data from the following outcomes:

1. parent reports;
2. independent observations of children's behaviour.

1. Parent reports

Three studies (Gross 1995; Gross 2003; Hutchings 2007) included parent-report follow-up data for both the intervention and control group for periods of one-year, six-months and three-months respectively, using two subscales of the ECBI outcome measure (ECBI-Intensity and ECBI-Problem subscales). We carried out two subgroup meta-analyses of the outcome measurements for these two subscales based on a total of 304 participants (190 intervention group and 114 control group) in each subgroup meta-analysis.

The inclusion of ECBI-Intensity scales produced an overall effect for the meta-analysis of: (SMD -0.38; 95% CI -0.62 to -0.15; Analysis 4.1), P=0.002, showing a significant difference favouring the intervention group, with an I^2 statistic of 57%, (P=0.1). The subgroup analysis of the three studies when ECBI-Problem scales were included also showed a significant difference favouring the intervention group (SMD -0.28; 95% CI -0.51 to -0.04; Analysis 4.2), P=0.02, and heterogeneity between studies was represented by an I^2 statistic of 28%, (P=0.25).

2. Independent observations of children's behaviour

The same three studies (Gross 1995; Gross 2003; Hutchings 2007) also reported follow-up data for both the intervention and control group for periods of one-year, three-months and six-months, using the Dyadic Parent-Child Interaction Scale (DPICS). The combined data of 304 participants (190 intervention group and 114 control group) showed a a small non-significant difference favouring the intervention group (SMD -0.19; 95% CI -0.42 to 0.05; Analysis 4.3). The heterogeneity between the studies was low (I^2 statistic: 5%, (P=0.11).

DISCUSSION

Summary of main results

We identified eight RCTs of variable quality (see below) evaluating the effectiveness of brief (4 to 12 weeks) group-based parenting programmes aimed at improving the emotional and behavioural adjustment of children aged up to 3 years 11 months (maximum mean age 3 years 11 months; age range one to five years). Post-intervention data from six studies for a total of 410 parents provided evidence of short-term effectiveness for both parent reports of children's emotional and behavioural adjustment (SMD -0.25; 95% CI -0.45 to -0.06; Analysis 3.1) or (SMD -0.22; 95% CI -0.42 to -0.03; Analysis 3.2), and independent observations of children's behaviour (SMD -0.54; 95% CI -0.84 to -0.23; Analysis 3.4), with slightly larger effects for the latter. The removal of the only study Bradley 2003 that was less than 10 weeks duration (Bradley 2003) (i.e. involving a brief three-week intervention plus one follow-up booster session) increased the effect size very slightly (SMD -0.36; 95% CI -0.62 to -0.10; Analysis 3.1); (SMD -0.30; 95% CI -0.57 to -0.04; Analysis 3.2); (SMD -0.27; 95% CI -0.53 to -0.01; Analysis 3.3).

One study utilised an unreliable method of randomisation (Nicholson 1998), and a sensitivity analysis which omitted this

study, resulted in a loss of significance (SMD -0.20; 95% CI -0.40 to 0.01; Analysis 3.1) and a small reduction of effect size, (i.e. 0.25 and 0.20). However, a meta-analysis of the more reliable data obtained from independent outcome assessors, which did not include Nicholson 1998, showed a large significant result favouring the intervention group (SMD -0.54; 95% CI -0.84 to -0.23; Analysis 3.4). These findings are consistent with the results of other systematic reviews of the evidence regarding the effectiveness of parenting programmes (e.g. NICE 2006; Dretzke 2009). Furthermore, some studies included more than one standardised measure of behaviour, and sensitivity analyses showed that the results were significant irrespective of the measure selected for inclusion in the meta-analysis.

There was a paucity of follow-up data available regarding the extent to which the effects of these programmes are maintained over time, and in a number of cases, only data for the intervention group were available. The three studies that provided follow-up data for both intervention and control groups had inconclusive results, and point to the need for further data before it will be possible to reach any firm conclusions concerning the long-term effectiveness of early parenting programmes of this nature.

One potential limitation of the included studies was the use of parent-reports, which tend to over-estimate the benefits of an intervention. On this occasion, however, the smaller independent assessments of outcomes had greater significance than the parent-reports. Ultimately, follow-up using both types of measures would be useful to gain a more complete understanding of the effectiveness of parenting programmes.

In this updated review we looked in more detail at the effectiveness of parenting programmes in the primary prevention of problems compared with programmes targeting young children with early (secondary) or existing (tertiary) problems. Three studies that provided post-intervention data examined the effectiveness of programmes aimed at the primary prevention of emotional and behavioural problems (Gross 2003; Nicholson 1998; Nicholson 2002) for a total of 200 children (108 intervention group and 92 control group); and three studies with data for the post-intervention period (Bradley 2003; Gross 1995; Sutton 1992) evaluated the effectiveness of parenting programmes targeted at children with early (secondary prevention) or existing problems (tertiary prevention) for a total of 210 children (100 intervention group and 110 control group). Subgroup analysis for primary prevention shows a non-significant result favouring the intervention group (SMD -0.21; 95% CI -0.49 to 0.07; Analysis 3.3), P=0.15, I^2 statistic: 56%, (P=0.10). Subgroup analysis for secondary/tertiary level programmes also showed a non-significant difference favouring the intervention group (SMD -0.20; 95% CI -0.48 to 0.07; Analysis 3.3), P=0.15, I^2 statistic: 69%, (P=0.04). These findings suggest that there was inadequate data available to assess the role of parenting programmes in the primary prevention of mental health problems.

Gross 2003 was a cluster randomised trial and we considered the effects of this on the results. A naïve analysis of the cluster randomised trial shows a significant result for the DPICS - Negative child behaviour: independent observer for parent/child interaction; (Analysis 1.1, please see analysis 1.1.16) and KPC (Classroom Behaviour Problems (KPC) (Analysis 1.1, please see analysis 1.1.22). To analyse the influence of the clustering a sensitivity analysis was conducted (data not shown) for different reasonable values of the intraclass (or intracluster) correlation coefficient (ICC) because an ICC from a similar study was not available. To lose statistical significance for these two significant outcomes, the ICC would have to be 0.038 (which equals a design effect of 1.81) for KPC and 0.061 (DE 2.24) for DPICS-R, which under the described circumstances would be extraordinarily high. Since the influence of an average ICC on the result would be small and no reliable estimate of the ICC is available we present and use the results as they were given in the publication.

We also looked at the effect of an adjustment for clustering on the meta-analyses that contain the data from Gross 2003. Any adjustment for the clustering would down-weight the study relative to other studies, since it increases the variance for that study (so decreases the inverse-variance weight). Since, in all cases, the point estimate from the study is nearer 0 than the meta-analytic result, the down-weighting would result in an overall estimate of the SMD that is further away from 0. We have no reliable estimate of the ICC, and there is a risk of overestimating it, in which case we could exaggerate the point estimate from the meta-analysis. Therefore we have opted not to use an adjustment for clustering to the results of Gross 2003 in the primary analyses.

Overall completeness and applicability of evidence

The studies included in this review all address the study question. Although in this updated review there is a slightly wider age-range of children (one to five years) as a result of the fact that some of the new studies included children with a mean age of 3 years and 11 months and that were thereby still within the mean of 3 years 11 months as specified in the inclusion criteria, the included programmes are all very similar in their focus, content and methods, although some of the analyses produced significant levels of statistical heterogeneity. Although the effect of using this cut-off was to exclude some trials of parenting programmes, this was consistent with the fact that all of these excluded studies focused primarily on much older children (three to eight years age range). Few of the trials were aimed at children aged under two, and although evidence relating to children from birth to a maximum mean age of 3 years 11 months was sought, included studies were rarely directed at the parents of very young children.

Two studies could not be included in the analyses because of the failure to include appropriate data e.g. means and standard deviations (Cummings 2000) or immediate post-intervention data

(Hutchings 2007). We contacted one author (Cummings 2000), but did not obtain any further data.

The studies were conducted in developed countries (please see Description of studies) and it is unclear whether the programmes could be replicated in other settings because there is currently no evidence available to make comparisons. Furthermore the sample sizes were on the whole small.

In terms of incomplete data only two studies adequately addressed this issue (Gross 2003 and Hutchings 2007). Nicholson 1998 reported that all participants remained in the groups to which they were allocated, but the allocation process was unreliable, and in the remaining studies, although the authors may have reported reasons for drop-outs and losses to follow-up, and used appropriate statistical tests to adjust for chance imbalance between the treatment and control groups, most of these studies would not have had sufficient power to detect small but potentially meaningful differences.

Quality of the evidence

Our risk of bias judgments were based on a number of potential biases (please see a summary of the risk of bias data for each study in Figure 1 and Figure 2). The overall quality of the included studies was poor, with most studies being unclear about important criteria including allocation concealment (no studies were adequately concealed and two were at high risk of bias); sequence generation (only one study had generated the sequences adequately and two studies were at high risk of bias) and blinding (one study was adequately blinded). The Nicholson 1998 study, employed a randomisation technique which was compromised by allocating some parents on the basis of availability for attendance and preference, although there is no evidence that participants knew which night the treatment was being delivered and so in choosing their night for attendance, they did not necessarily influence their allocation. Some parents did not have a preference, and they were randomly assigned to either the treatment or the control condition. We have addressed the risk of bias raised by this by conducting a sensitivity analysis, which reduced the overall estimate of effectiveness i.e. was no longer statistically significant. However, the effect sizes are still very similar and, it is interesting that the confidence interval has approximately the same width across the two analyses. While the apparently flawed randomisation of this study may have introduced bias, the meaning of the result does not change even when Nicholson 1998 is excluded from the analysis. Furthermore, the more reliable independent assessments of outcomes suggest a much larger and significant result. We examined the included studies for evidence of other potential biases and we made particular reference to conflict of interest as this is a field where some programme developers supply and deliver the intervention as a commercial venture. The only other potential source of bias identified in one study was that of a conflict of interest (Hutchings 2007), where the programme evaluator was also employed by the programme developer. It is not clear, however, to what extent this situation may have applied to other studies.

Figure 1. Methodological quality graph: review authors' judgements about each methodological quality item presented as percentages across all included studies.

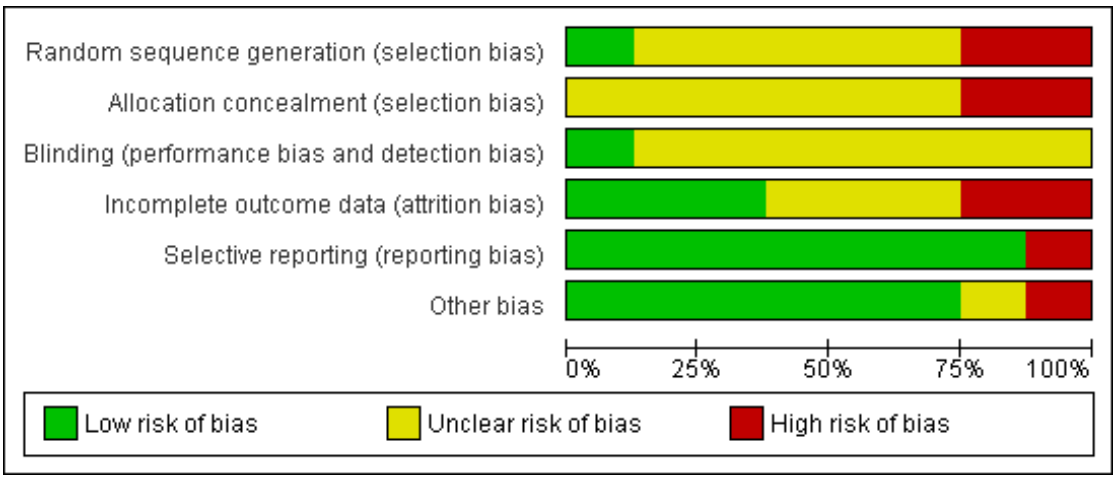
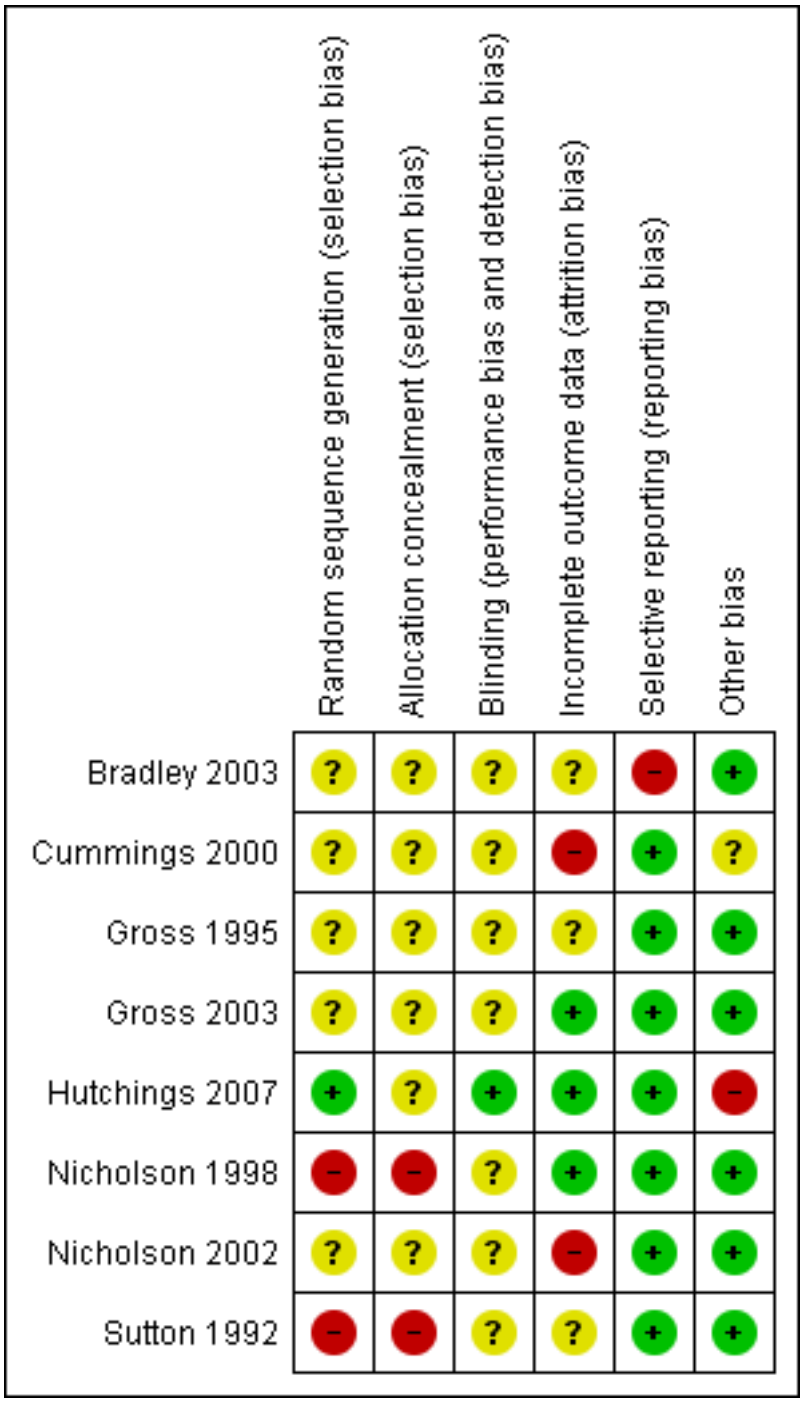


Figure 2. Methodological quality summary: review authors' judgements about each methodological quality item for each included study.



All of the included studies had a number of methodological flaws compromising the generalisability of the findings. One of the studies used volunteers only (Nicholson 1998), and it was unclear in the Gross 1995 study whether the participants were referred or volunteered i.e. they were recruited from an HMO and its surrounding community. Four studies employed specific eligibility criteria in terms of children's emotional or behavioural adjustment (Bradley 2003; Gross 1995; Hutchings 2007; Sutton 1992), and a further study had less clear criteria but was also directed at children with behavioural difficulties (Cummings 2000). The remaining three studies used either population (Nicholson 1998) or high-risk (Gross 2003; Nicholson 2002) samples.

Both mothers and fathers participated in the parenting programmes being evaluated in the included studies and the results of this review are generalisable to both parents. Only one of the included studies provided information concerning the ethnicity of the included parents, and this reported that parenting programmes can be effective with parents from a range of minority ethnic groups including Latino and African-American parents (Gross 2003).

In two studies the drop-out rate was in the region of 30% (Gross 1995; Gross 2003; Hutchings 2007). In one of these studies the parents who dropped out had significantly lower over-reactive discipline scores than parents who remained, indicating that they were less likely to use harsh and coercive discipline strategies. They were also more likely to be Latino. This study did not report the attrition rate of participants by the group they were randomised to, therefore in our analyses we used the initial participant numbers for each group at each time point (Gross 2003), which may slightly decrease the treatment effect. In the second study, parents who dropped out all rated their children's behaviour as being less problematic than the parents who continued with the intervention. While the Nicholson 2002 study reported a 10% dropout rate, it is not clear whether the parents who dropped out were included in the analyses or indeed from which of the groups they dropped out. Other studies have shown that premature termination from parent education programmes among families with children referred for antisocial behaviour was associated with more severe conduct disorder symptoms and more delinquent behaviours; mothers reporting greater stress from their relations with the child, their own role functioning, and life events; and families being at greater socio-economic disadvantage (Kazdin 1990). Other studies have also identified individuals more likely to drop out as including those from a lower social class or a minority ethnic group (Farrington 1991; Holden 1990; Strain 1981), and those children with a greater number of presenting problems (Holden 1990). There are a number of points at which a parent may drop-out of a parenting programme. Research has shown that failure to persist through the initial intake is associated with parental feelings of helplessness and negativity, and that failure to persist through the programme itself is associated with therapist inexperience (Frankel 1992). These problems surrounding the issue of attrition and drop-out point to the importance of evaluating the results of trials on an intention-to-treat basis which would limit bias arising from this source.

Potential biases in the review process

The review was undertaken in accordance with the Cochrane Collaboration guidelines, and will as such be subject to limited biases.

Agreements and disagreements with other studies or reviews

There are a number of systematic reviews evaluating the effectiveness of parenting programmes, but this is the first looking at:

1. their effectiveness with this particular age-group;
2. the effectiveness of primary/secondary prevention

compared with tertiary or indicated approaches.

The findings of this review are consistent with recent systematic reviews of the effectiveness of parenting programmes with older children showing their effectiveness (e.g. Dretzke 2009).

AUTHORS' CONCLUSIONS

Implications for practice

We identified eight RCTs of variable quality evaluating the effectiveness of brief (4 to 12 weeks) group-based parenting programmes in improving the emotional and behavioural adjustment of children aged up to 3 years 11months (maximum mean age 3 years 11 months; age range one to five years). Data from six studies (Bradley 2003; Gross 1995; Gross 2003; Nicholson 1998; Nicholson 2002) provided evidence of short-term effectiveness for both parent reports of children's emotional and behavioural adjustment, although effectiveness was lost with the removal of one unreliable study (Nicholson 1998), but independent observations of children's behaviour from three studies showed slightly larger and significant effects. There was limited evidence to suggest that longer interventions might be of more benefit because the removal of the only study Bradley 2003 that was less than 10 weeks duration increased the effect size very slightly.

There was a paucity of follow-up data available regarding the extent to which the effects of these programmes are maintained over time, and in a number of cases, only data for the intervention group were available. The three studies that provided follow-up data for both intervention and control groups had mixed results, and point to the need for further data before it will be possible to reach any

firm conclusions concerning the long-term effectiveness of early parenting programmes of this nature.

The findings of this review provide some support for the use of group-based parenting programmes to improve the emotional and behavioural adjustment of children with a maximum mean age of 3 years 11 months. The limited evidence available concerning the extent to which these results are maintained over time, however, is equivocal, and it may be that during this period of rapid change in the infant's development, further input at a later date is required. More research is needed before questions of this nature can be answered.

All of the included studies were of behavioural, cognitive-behavioural, or video-tape modelling parenting programmes, and the results should not therefore be generalised to other types of parenting programme.

There is currently insufficient evidence to reach any firm conclusions regarding the role of parenting programmes in the primary prevention of mental health problems, and further research on this important topic is needed.

Implications for research

It has not been possible with the limited data available in this review to provide conclusive evidence regarding the extent to which the positive effects identified, are maintained over time. Neither has it been possible to assess the role of parenting programmes in the primary prevention of mental health problems.

There is conclusive evidence to show that the quality of the parent-infant relationship during infancy is important for the future mental health of the child and adult. Parenting programmes can improve the emotional and behavioural adjustment of infants and toddlers. The preliminary evidence that has been provided in this review points to an urgent need for large-scale trials of the effectiveness of parenting programmes in the primary prevention of mental health problems. Rigorous studies of parenting programmes that are provided on a primary preventive population-basis, to all parents during the prenatal and/or immediate postnatal period and also to targeted groups should be carried out. Larger numbers of participants should be included to increase the external validity of the research, and the measurement of a wider range of outcomes should be undertaken, including an assessment of mental health. Such studies would provide the basis for further long-term follow-up through childhood and possibly even adolescence.

The limited follow-up data available point to the need for further research to assess to what extent the results of such programmes are maintained over time, and whether parents require further input at a later date. Evidence concerning the longer-term effectiveness of such programmes, i.e. at school entry and later, is also required.

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REFERENCES

References to studies included in this review

Bradley 2003 ***{published data only}***
Bradley S, Jadda DA, Brody J, Landy S, Tallet S, Watson W, et al.Brief psychoeducational parenting program: an evaluation and 1-year follow-up. *Journal of the American Academy of Child and Adolescent Psychiatry* 2003;**42**(10): 1171–8.

Cummings 2000 ***{unpublished data only}***
Cummings, LL. Parent training: A program for parents of two- and three-year-olds. PhD, Central Michigan University, Mount Pleasant, Michigan, USA. Michigan, USA: Central Michigan University, 2000:1–82.

Gross 1995 ***{published data only}***
Gross D, Fogg L, Tucker S. The efficacy of parent training for promoting positive parent-toddler relationships. *Research in nursing and health* 1995;**18**:489–99.

Gross 2003 ***{published data only}***
Gross D, Fogg L, Webster-Stratton C, Garvey C, Julion W, Grady J. Parent training of toddlers in day care in low-income urban communities. *Journal of Consulting and Clinical Psychology* 2003;**71**(2):261–78.

Hutchings 2007 ***{published data only}***
Hutchings J, Bywater T, Daley D, Gardner F, Whitaker C, Jones K, et al.Parenting intervention in Sure Start services for children at risk of developing conduct disorder:

pragmatic randomised controlled trial. British Medical Journal 2007; Vol. 334, issue 7595:678–82. [MEDLINE: 10600]

Jones K, Daley D, Hutchings J, Bywater T, Eames C. Efficacy of the Incredible Years basic parent training programme as an early intervention for children with conduct problems and ADHD. *Child: care, health and development* 2007;**33**(6):749–56.

Nicholson 1998 *{published data only}*

Nicholson B, Janz P, Fox R. Evaluating a brief parental-education program for parents of young children. *Psychological Reports* 1998;**82**:1107–13.

Nicholson 2002 *{published data only}*

Nicholson B, Anderson M, Fox R, Brenner V. One family at a time: a prevention program for at-risk parents. *Journal of Counselling and Development* 2002;**80**(3):362–71.

Sutton 1992 *{published and unpublished data}*

Sutton C. Training parents to manage difficult children-a comparison of methods. *Behavioural Psychotherapy* 1992; **20**:115–39.

References to studies excluded from this review

Adesso 1981 *{published data only}*

Adesso VJ, Lipson JW. Group training of parents as therapists for the children. *Behavior Therapy* 1981;**12**(5): 625–33.

Barber 1992 *{published data only}*

Barber JG. Evaluating parent education groups: effects on sense of competence and social isolation. *Research on Social Work Practice* 1992;**2**(1):28–38.

Baydar 2003 *{published data only}*

Baydar N. Email correspondence clarifying the age of the trial participants. Personal communication 5 May 2008.

* Baydar N RM, Webster Stratton C. The role of mental health factors and program engagement in the effectiveness of a preventive parenting program for Head Start mothers. Child development 2003; Vol. 74, issue 5:1433–53. [MEDLINE: 900; : CN–00458200]

Bergan 1983 *{published data only}*

Bergan JR, Neumann AJ, Karp CL. Effects of parent training on parent instruction and child learning of intellectual skills. *Journal of School Psychology* 1983;**21**(1): 31–9.

Bierman 2000 *{published data only}*

Bierman KL, Coie JD, Dodge KA, et al.Merging universal and indicated prevention programs: the fast track model. *Addictive Behaviors* 2000;**25**(6):913–27.

Bor 2002 *{published data only}*

Bor W, Sanders M, Markie-Dadds C. The effects of the Triple P - Positive Parenting Program on preschool children with co-occurring disruptive behavior and attentional/ hyperactive difficulties. Journal of Abnormal Child Psychology 2002; Vol. 30, issue 6:571–87. [MEDLINE: 3730]

Brody 1985 *{published data only}*

Brody GH, Forehand R. The efficacy of parent training with maritally distressed and nondistressed mothers: a multimethod assessment. *Behaviour Research and Therapy* 1985;**23**(3):291–6.

Brotman 2003 *{published data only}*

* Brotman LM, Klein RG, Kamboukos D, Brown EJ, Coard SI, Sosinski LS. Preventive intervention for urban, low-income preschoolers at familial risk for conduct problems: a randomised pilot study. *Journal of Clinical Child and Adolescent Psychology* 2003;**32**(2):246–57.

Brotman 2005a *{published data only}*

Brotman L, Gouley K, Chesir-Teran D, Dennis T, Klein R, Shrout P. Prevention for preschoolers at high risk for conduct problems: immediate outcomes on parenting practices and child social competence. Journal of clinical child and adolescent psychology 2005; Vol. 34, issue 4: 724–34. [MEDLINE: 12040]

Brunk 1987 *{published data only}*

Brunk MA, Henggeler SW, Whelan JP. Comparison of multisystemic therapy and parent training in the brief treatment of child abuse and neglect. *Journal of Consulting and Clinical Psychology* 1987;**55**(2):171–8.

Caughy 2004 *{published data only}*

Caughy M, Huang K, Miller T, Genevro J. The effects of the healthy steps for young children program: results from observations of parenting and child development. Early Childhood Research Quarterly 2004; Vol. 19, issue 4: 611–30. [MEDLINE: 12550]

Cunningham 1995 *{published data only}*

Cunningham CE, Bremner R, Boyle M. Large group community-based parenting programs for families of preschoolers at risk for disruptive behavior disorders - utilization, cost-effectiveness, and outcome. *Journal of Child Psychology and Psychiatry and Allied Disciplines* 1995;**36**(7): 1141–59.

Dadds 1992 *{published data only}*

Dadds MR, McHugh TA. Social support and treatment outcome in behavioral family therapy for child conduct problems. *Journal of Consulting and Clinical Psychology* 1992;**60**(2):252–9.

Drummond 2005 *{published data only}*

Drummond J, Fleming D, McDonald L, Kysela G. Randomized controlled trial of a family problem-solving intervention. Clinical Nursing Research 2005; Vol. 14, issue 1:57–8. [MEDLINE: 16320]

EHSRC 2001 *{published data only}*

The Early Head Start Research Consortium. Building their future: How early Head Start Programmes are enhancing the lives of infants and toddlers in low-income families. *Institution: Matematica Policy Research, Princenton, NJ. Columbia University, New York. Center for children and families*. Vol. **Technical report**, New York: The Commissioner's Office of Research and Evaluation And the Head Start Bureau, Administration on Children, Youth

and Families, Department of Health and Human Services, 2001:28.

Esdaile 1995 *{published data only (unpublished sought but not used)}*
Esdaile SE. A play-focused intervention involving mothers of preschoolers. *American Journal of Occupational Therapy* 1995;**50**(2):113–213.

Fanning 2007 *{published data only}*
Fanning, JL. Parent training for caregivers of typically developing, economically disadvantaged preschoolers: An initial study. PhD, University of Oregon, Oregon, USA. PhD. University of Oregon, Oregon, USA; Ref: UMI 3276047, 249.

Farrar 2005 *{published data only}*
Farrar, RLE. The effect of a cognitively based parent training intervention on parental stress. PhD, The University of Tulsa, Oklahoma, USA. PhD. Oklahoma, USA: The University of Tulsa; Ref: UMI 3161353, 2005:155.

Fleming 2002 *{published data only}*
Fleming, DS. Promoting healthy child development: A population health approach. PhD, University of Alberta, Canada 2002:144.

Forgatch 1979 *{published data only}*
Forgatch MS, Toobert DJ. A cost-effective parent training program for use with normal preschool children. *Journal of Pediatric Psychology* 1979;**4**(2):129–45.

Formiga 2004 *{published data only}*
Formiga CK, Pedrazzani ES, Silva FPdS, de Lima CD. Effectiveness of the early intervention program with preterm infants [Eficácia de um programa de intervenção precoce com bebês pré–termo]. Cadernos de Psicologia e Educação Paidéia 2004; Vol. 14, issue 29:301–11. [MEDLINE: 16340]

Hanisch 2006 *{published data only}*
Hanisch C, Pluck J, Meyer N, Brix G, Freund-Braier I, Hautmann C, et al.Short-term effects of the indicated prevention programme for externalizing problem behaviour (Pep). Zeitschrift Fur Klinische Psychologie Und Psychotherapie 2006; Vol. 35, issue 2:117–26. [MEDLINE: 11500]

Harris 1989 *{published data only}*
Harris J LJ. Parent education as a mandatory component of preschool: effects on middle-class, educationally advantaged parents and children. *Early Childhood Research Quarterly* 1989;**4**(3):275–87.

Helfenbaum-Kun 2007 *{published data only}*
Helfenbaum-Kun E, Ortiz C. Parent-training groups for fathers of Head Start children: a pilot study of their feasibility and impact on child behavior and intra-familial relationships. Child & Family Behavior Therapy 2007; Vol. 29, issue 2:47–64. [MEDLINE: 10330]

James-Roberts 2001 *{published data only}*
James-Roberts I, Sleep J, Morris S, Owen C, Gillham P. Use of a behavioural programme in the first 3 months to prevent infant crying and sleeping problems. Journal-of-Paediatrics-and-Child-Health 2001; Vol. 37, issue 3: 289–97. [MEDLINE: 17480]

Kern 2007 *{published data only}*
Kern L, DuPaul G, Volpe R, Sokol N, Lutz JG, Arbolino L, et al.Multisetting assessment-based intervention for young children at risk for attention deficit hyperactivity disorder: Initial effects on academic and behavioral functioning. School-Psychology-Review 2007; Vol. 36, issue 2:237–5. [MEDLINE: 15440]

Lambermon 1989 *{published data only}*
Lambermon MWE, van IJzendoorn MH. Influencing mother-infant interaction through videotaped or written instruction: evaluation of a parent education program. *Early Childhood Research Quarterly* 1989;**4**(4):449–58.

Letourneau 2001 *{published data only}*
Letourneau N, Drummond J, Fleming D, Kysela G, McDonald L, Stewart M. Supporting parents: can intervention improve parent-child relationships?. Journal of Family Nursing 2001; Vol. 7:159–87. [MEDLINE: 17450]

Love 2005 *{published data only}*
Love J, Kisker E, Ross C, Raikes H, Constantine J, Boller K, et al.The effectiveness of early Head Start for 3-year-old children and their parents: lessons for policy and programs. Developmental Psychology 2005; Vol. 41, issue 6:885–901. [MEDLINE: 11950]

Markie-Dadds 2006 *{published data only}*
Markie-Dadds C, Sanders M. Self-directed Triple P (Positive Parenting Program) for mothers with children at-risk of developing conduct problems. Behavioural and Cognitive Psychotherapy 2006; Vol. 34, issue 3:259–75. [MEDLINE: 11190]

Mazza 2002 *{published data only}*
Mazza C. Young dads: the effects of a parenting program on urban African-American adolescent fathers. Adolescence 2002; Vol. 37, issue 148:681–93. [MEDLINE: 1120; : CN–00435179]

McBride 1991a *{published data only}*
McBride BA. Parent education and support programs for fathers: outcome effects on paternal involvement. *Early Child Development and Care* 1991;**67**:73–85.

McDade 1998 *{published data only}*
McDade A, McCartan P. 'Partnership with parents' a pilot project. *International Journal of Language and Communication Disorders* 1998;**33 Suppl**:556–61.

Mcgoey 2005 *{published data only}*
Mcgoey K, DuPaul G, Eckert T, Volpe R, Van Brakle J. Outcomes of a multi-component intervention for preschool children at-risk for Attention-Deficit/Hyperactivity Disorder. Child & Family Behavior Therapy 2005; Vol. 27, issue 1:33–56. [MEDLINE: 12240]

Mendelsohn 2007 *{published data only}*
Mendelsohn A, Valdez P, Flynn V, Foley G, Berkule S, Tomopoulos S, et al.Use of videotaped interactions during pediatric well-child care: impact at 33 months on parenting and on child development. Journal of Developmental and Behavioral Pediatrics 2007; Vol. 28, issue 3:206–12. [MEDLINE: 15430]

Minkovitz 2003 *{published data only}*
Minkovitz C, Hughart N, Strobino D, Scharfstein D, Grason H, Hou W, et al.A Practice-Based Intervention to Enhance Quality of Care in the First 3 Years of Life. The Healthy Steps for Young Children Program. Jama (Journal of the American Medical Association) 2003; Vol. 290, issue 23:3081–91. [MEDLINE: 8370]

Moxley 1983 *{published data only}*
Moxley Haegert L, Serbin LA. Developmental education for parents of delayed infants: effects on parental motivation and children's development. *Child Development* 1983;**54** (5):1324–31.

Neef 1995 *{published data only}*
Neef NA. Pyramidal parent training by peers. *Journal of Applied Behavior Analysis* 1995;**28**(3):333–7.

Nixon 2004 *{published data only}*
Nixon R, Sweeney L, Erickson D, Touyz S. Parent-child interaction therapy: one- and two-year follow-up of standard and abbreviated treatments for oppositional preschoolers. Journal of Abnormal Child Psychology 2004; Vol. 32, issue 3:263–71. [MEDLINE: 2980]

Nurcombe 1984 *{published data only}*
Nurcombe B, et al.An intervention program for mothers of low-birthweight infants: Preliminary results. *Journal of the American Academy of Child Psychiatry* 1984;**23**(3):319–25.

Ostergren 2003 *{published data only}*
Ostergren C. Evaluation of a temperament-based parenting program: factors affecting program usefulness, ease of understanding, preferred amount of materials and parental attitudes. Dissertation abstracts international 2003; Vol. 64, issue 5. [MEDLINE: 14880; : 0419–4209]

Owen 2007 *{published data only}*
Owen P. Fostering preschooler attachment and development through a relationship-based group parent-training program. PhD Dissertation, Alliant International University, Fresno, California, USA 2007 Vol. 104.

Perez-Nieves 2001 *{published data only}*
Perez-Nieves, L. A comparative study of REBT/Parent training versus parent training with Hispanic parents of exceptional preschoolers. PhD, St. Jhon's University, New York 2001:87.

Pisterman 1989 *{published data only}*
Pisterman S, McGrath P, Firestone P, Goodman JT, Webster I, Mallory R. Outcome of parent-mediated treatment of preschoolers with attention deficit disorder with hyperactivity. *Journal of Consulting and Clinical Psychology* 1989;**57**(5):628–35.

Plant 2007 *{published data only}*
Plant K, Sanders M. Reducing problem behavior during care-giving in families of preschool-aged children with developmental disabilities. Research in Developmental Disabilities 2007; Vol. 28, issue 4:362–85. [MEDLINE: 1400]

Puckering 1994 *{published data only}*
Puckering Christine, Rogers John, Mills Maggie, Cox A D, Mattsson Graf Magdalena. Process and evaluation of a group intervention for mothers with parenting difficulties. *Child Abuse Review* 1994;**3**(4):299–310.

Quinn 2007 *{published data only}*
Quinn M, Carr A, Carroll L, O'sullivan D. Parents Plus Programme I: evaluation of Its effectiveness for pre-school children with developmental disabilities and behavioural problems. Journal of Applied Research in Intellectual Disabilities 2007; Vol. 20, issue 4:345–59. [MEDLINE: 10350]

Rapee 2005 *{published data only}*
Rapee R, Kennedy S, Ingram M, Edwards S, Sweeney L. Prevention and early intervention of anxiety disorders in inhibited preschool children. Journal of Consulting & Clinical Psychology 2005; Vol. 73, issue 3:488–97. [MEDLINE: 2500]

Roosa 1983 *{published data only}*
Roosa M VL. Teen mothers enrolled in an alternative parenting program: a comparison with their peers. *Urban Education* 1983;**18**(3):348–60.

Routh 1995 *{published data only}*
Routh CP, Hill JW, Steele H, Elliot CE, Dewey ME. Maternal attachment status, psychosocial stressors and problem behaviour: Follow-up after parent training courses for conduct disorder. *Journal of Child Psychology and Psychiatry and Allied Disciplines* 1995;**36**(7):1179–98.

Sanders 2000 *{published data only}*
Sanders MR, Markie Dadds C, Tully LA, Bor W. The Triple P-positive parenting program: a comparison of enhanced, standard, and self-directed behavioral family intervention for parents of children with early onset conduct problems. *Journal of Consulting and Clinical Psychology* 2000;**68**(4): 624–40.

Sanders 2004 *{published data only}*
Sanders M, Pidgeon A, Gravestock F, Connors M, Brown S, Young R. Does parental attributional retraining and anger management enhance the effects of the Triple P-Positive Parenting Program with parents at risk of child maltreatment?. Behavior Therapy 2004; Vol. 35, issue 3: 513–35. [MEDLINE: 12700]

Sanders 2007 *{published data only}*
Sanders M, Bor W, Morawska A. Maintenance of treatment gains: a comparison of enhanced, standard, and self-directed Triple P-Positive Parenting Program. Journal of Abnormal Child Psychology 2007; Vol. 35, issue 6:983–98. [MEDLINE: 10100]

Schachman 2001 *{published data only}*
Schachman, KA. Baby boot camp: Facilitating maternal role adaptation in military wives. PhD, University of Missouri - St Louise, Missouri, USA 2001:140.
Schachman KA, Lee RK, Lederman RR. Baby Boot Camp - facilitating maternal role adaptation among military wives. Nursing Research 2004; Vol. 53, issue 2:107–15. [MEDLINE: 12960]

Shaw 2006 *{published data only}*
Shaw D, Dishion T, Supplee L, Gardner F, Arnds K. Randomized trial of a family-centered approach to the

prevention of early conduct problems: 2-year effects of the family check-up in early childhood. Journal of Consulting and Clinical Psychology 2006; Vol. 74, issue 1:1–9. [MEDLINE: 11590]

Sheeber 1994 *{published data only}*
Sheeber LB, Johnson JH. Evaluation of a temperament-focused, parent-training program. *Journal of Clinical Child Psychology* 1994;**23**(3):249–59.

Shelton 2000 *{published data only}*
Shelton TL, Barkley RA, Crosswait C, et al.Multimethod psychoeducational intervention for preschool children with disruptive behavior: Two-year post-treatment follow-up. *Journal of Abnormal Child Psychology* 2000;**28**(3):253–66.

Siegert 1980 *{published data only}*
Siegert FE, Yates BT. Behavioral child-management cost-effectiveness. A comparison of individual in-office, individual in-home, and group delivery systems. *Evaluation and the Health Professions* 1980;**3**(2):123–52.

Sonuga-Barke 2001 *{published data only}*
Sonuga-Barke E, Daley D, Thompson M, Laver-Bradbury C, Weeks A. Parent-based therapies for preschool attention-deficit/hyperactivity disorder: a randomized, controlled trial with a community sample. Journal of the American Academy of Child & Adolescent Psychiatry 2001; Vol. 40, issue 4:402–8. [MEDLINE: 4390]

Sonuga-Barke 2004 *{published data only}*
Sonuga-Barke E, Thompson M, Daley D, Laver-Bradbury C. Parent training for Attention Deficit/Hyperactivity Disorder: is it as effective when delivered as routine rather than as specialist care?. British Journal of Clinical Psychology 2004; Vol. 43, issue 4:449–57. [MEDLINE: 2810]

Strayhorn 1989 *{published data only}*
Strayhorn JM, Weidman CS. Reduction of attention deficit and internalizing symptoms in preschoolers through parent-child interaction training [published erratum appears in J Am Acad Child Adolesc Psychiatry 1990 Mar;29(2):314]. *Journal of the American Academy of Child and Adolescent Psychiatry* 1989;**28**(6):888–96.

Tiedemann 1992 *{published data only}*
Tiedemann GL, Johnston C. Evaluation of a parent training-program to promote sharing between young siblings. *Behavior Therapy* 1992;**23**(2):299–318.

Truss 1977 *{published data only}*
Truss C. Parent training in preprimary competence. Paper Presented at Annual Convention of the American Psychological Association. 1977.

Turner 1994 *{published data only}*
Turner KMT, Sanders MR, Wall CR. Behavioural parent training versus dietary education in the treatment of children with persistent feeding difficulties. *Behaviour Change* 1994;**11**(4):242–58.

Turner 2006 *{published data only}*
Turner K, Sanders M. Help when it's needed first: a controlled evaluation of brief, preventive behavioral family intervention in a primary care setting. Behavior Therapy 2006; Vol. 37, issue 2:131–42. [MEDLINE: 2020]

US Health Department 2001 *{published data only}*
US Department of Health and Human Services. Building their futures: How Early Head Start Programs are enhancing the lives of Infants and toddlers in low-income families. Summary Report. Early Head Start Research. US Department of Health and Human Services. Commissioner's Office of Research and Evaluation and the Head Start Bureau. Administration for Children & Families, 2001:28. [MEDLINE: 0010221630 ED448894 AU - Administration for Children, Youth, and Families (DHHS), Washington, DC. Office of Research and Evaluation. AU - Administration for Children, Youth, and Families (DHHS), Washington, DC. Head Start Bureau]

Webster-Stratton1982b *{published data only}*
Webster Stratton C. Teaching mothers through videotape modeling to change their children's behavior. *Journal of Pediatric Psychology* 1982;**7**(3):279–94.

Webster-Stratton 2001 *{published data only}*
Webster Stratton C, Reid M, Hammond M. Preventing conduct problems, promoting social competence: a parent and teacher training partnership in head start. Journal of clinical child psychology 2001; Vol. 30, issue 3:283–302. [MEDLINE: 1310; : CN–00456240]

Wint 1987 *{published data only}*
Wint E BJ. Promoting effective parenting: a study of two methods in Kingston, Jamaica. *Child Welfare* 1987;**66**(6): 507–16.

Additional references

Atkinson 2000
Martins C, Gaffan EA. Effects of early maternal depression on patterns of infant-mother attachment: A meta-analytic investigation. *Journal of Child Psychology and Psychiatry* 2000;**20**(10):1019–40.

Barlow 2001
Barlow J, Coren E. Parent-training programmes for improving maternal psychosocial health. *Cochrane Database of Systematic Reviews* 2001, Issue 2. [DOI: 10.1002/14651858.CD002020.pub2]

Barlow 2003
Barlow J, Stewart-Brown S. Why a universal population-level approach to the prevention of child abuse is essential. *Child Abuse Review* 2003;**12**(5):279–81.

Barrett 2006
Barrett H. *Attachment and the perils of parenting: a commentary and a critique*. London: NFPI, 2006.

Baydar 2008
Baydar N. Email correspondence clarifying the age of the trial participants. Personal communication 5 May 2008.

Bone 1989
Bone M, Meltzer H. The prevalence of disability among children. *OPCS Surveys of disability in Great Britain*. Vol. **Report 3**, London: HMSO, 1989.

Bowlby 1998
Bowlby J. *A secure base: clinical applications of attachment theory*. 1st Edition. Routledge, 1998.

Campbell 1995
Campbell SB. Behavior problems in preschool children: a review of recent research. *Journal of Child Psychology and Psychiatry* 1995;**36**(1):113–49.

Champion 1995
Champion LA, Goodall G, Rutter M. Behaviour problems in childhood and stressors in early adult life: 1. A 20 year follow-up of London school children. *Psychiatric Medicine* 1995;**25**(2):231–46.

DoH 1995
Department of Health. *Improving the health of mothers and children: NHS priorities for research and development*. London: Stationery Office, 1995.

Dretzke 2009
Dretzke J, Davenport C, Frew E, Barlow J, Stewart-Brown S, Bayliss S, et al.The clinical effectiveness of different parenting programme for children with conduct problems: A systematic review of randomised controlled trials. *Child and Adolescent Psychiatry and Mental Health* 2009;**35**(4): 589–90(2).

Egeland 1993
Egeland BE, Carlson E, Sroufe A. Resilience as process. *Development and Psychopathology*. Cambridge: Cambridge University Press, 1993.

Erol 2005
Erol N, Simsek Z, Oner O, Munir K. Behavioral and emotional problems among Turkish children at ages 2 to 3 years. *Journal of the American Academy of Child and Adolescent Psychiatry* 2005;**44**(1):80–7.

Eron 1990
Eron LD, Huesmann LR. The stability of aggressive behavior - even into the third generation. In: Lewis M, Miller SM editor(s). *Handbook of Developmental Psychopathology*. New York: Plenum Press, 1990:147–56.

Farrington 1991
Farrington DP. Childhood aggression and adult violence: early precursors and later life outcomes. *The development and treatment of adult aggression*. Hillsdale, NJ: Lawrence Erlbaum, 1991:5–29.

Farrington 1994
Farrington DP. Early developmental prevention of juvenile delinquency. *Criminal Behaviour and Mental Health* 1994; **4**:209–27.

Fonagy 1997
Fonagy P, Redfern S, Charman T. The relationship between belief-desire reasoning and a projective measure of attachment security (SAT). *British Journal of Developmental Psychology* 1997;**15**:51–61.

Fonagy 1998
Fonagy P. Prevention, the appropriate target of infant psychotherapy. *Infant Mental Health Journal* 1998;**19**(2): 124–50.

Frankel 1992
Frankel, Simmons F, Simmons JQ. Parent behavioral training: why and when some parents drop out. *Journal of Clinical Psychology* 1992;**4**:322–30.

Furniss 2006
Furniss T, Beyer T, Guggenmos J. Prevalence of behavioural and emotional problems among six year old preschool children: baseline results of a prospective longitudinal study. *Social Psychiatry and Psychiatric Epidemiology* 2006;**41**(5): 394–9.

Garnier 1998
Garnier HE, Stein JA. Values and the family: risk and protective factors for adolescent problem behaviours. *Youth and Society* 1998;**30**(1):89–120.

Hay 2001
Hay DF, Pawlby S, Sharp D, Asten P, Mills A, Kumar R. Intellectual problems shown by 11-year old children whose mothers had postnatal depression. *Journal of Child Psychology and Psychiatry* 2001;**42**(7):871–89.

Higgins 2002
Higgins JPT, Thompson SG. Quantifying heterogeneity in a meta-analysis. *Statistics in Medicine* 2002;**21**:1539–58.

Higgins 2008
Higgins JPT, Green S (editors). *Cochrane Handbook for Systematic Reviews of Interventions*. The Cochrane Collaboration, 2008. Available from www.cochrane-handbook.org Version 5.0.0 [updated February 2008].

Holden 1990
Holden GW, Lavigne VV, Cameron AM. Probing the continuum of effectiveness in parent training: characteristics of parents and preschoolers. *Journal of Clinical Child Psychology* 1990;**19**(1):2–8.

Incredible Years 2009
Webster-Stratton C. Incredible Years Program. http://www.incredibleyears.com/ viewed 30/9/2009.

Johnson 1973
Johnson CA, Katz RC. Using parents as change agents for their children: a review. *Journal of Child Psychology and Psychiatry and Allied Disciplines* 1973;**14**(3):181–200.

Jones 2007
Jones K, Daley D, Hutchings J, Byawater T, Eames C. Efficacy of the Incredible Years Basic parent training programme as an early intervention for children with conduct problems and ADHD. *Child: care, health and development* 2007;**33**(6):749–56.

Kane 2007
Kane GA, Wood VA, Barlow J. Parenting Programmes: A systematic review and synthesis of qualitative research. *Child: Care, Health and Development* 2007;**33**(6):784–93.

Kazdin 1990
Kazdin AE. Premature termination from treatment among children referred for antisocial behavior. *Journal of child psychology and psychiatry* 1990;**31**(3):415–25.

Kemppinen 2007
Kemppinen K, Raita-Hasu J, Toivonen-Falck A, Kumpulainen K, Eeling H, Moilanen I, et al.Early maternal sensitivity and child behaviour at toddler age: Does low maternal sensitivity hinder identification of behavioural problems. *Journal of Reproductive and Infant psychology* 25; **4**:270–84.

Kumpfer 2004
Kumpfer KL, Bluth B. Parent/child transactional processes predictive of resilience or vulnerability to substance abuse disorders. *Substance Use and Misue* 2004;**39**(5):671–98.

Loeber 1997
Loeber R, Hay D. Key issues in the development of aggression and violence from childhood to early adulthood. *Annual Review of Psychology* 1997;**48**:371–410.

Madigan 2006
Madigan M, Bakermans-KranenburgM, van Ijzendoorn G, Moran DR, Pederson DR, Benoit D. Unresolved states of mind, anomalous parental behaviour and disorganized attachment: A review and meta-analysis of a transmission gap. *Attachment and Human Behavior* 2006;**8**:89–111.

Martens 2000
Martins C, Gaffan EA. Effects of early maternal depression on patterns of infant-mother attachment: a meta-analytic investigation. *Journal of Child Psychology and Psychiatry* 2000;**41**(6):737–46.

Moffit 1996
Moffit TE, Caspi A, Dickson N, Silva P, et al.Childhood-onset versus adolescent-onset antisocial conduct problems in males: Natural history from ages 3 to 18 years. *Developmental Psychiatry* 1996;**8**(2):399–424.

Murray 2003
Murray L, Cooper P. Intergenerational transmission of affective and cognitive processes associated with depression: infancy and the preschool years. In: Goodyear I editor(s). *Unipolar depression: A lifespan perspective*. Oxford: OUP, 2003:17–46.

NICE 2006
National Institute for Health and Clinical Excellence. *Parent training/education programmes in the management of children with conduct disorders*. London: NICE, 2006.

Offord 1994
Offord MD, Bennett KJ. Conduct disorder: long-term outcomes and intervention effectiveness. *Journal of the American Academy of Child and Adolescent Psychiatry* 1994; **33**(8):1069–78.

Ogawa 1997
Ogawa JR, Sroufe AL, Weinfeild NS, Carlson EA, Egeland B. Development and the fragmented self: Longitudinal study of dissociative symptomatology in a nonclinical sample. *Development and Psychopathology* 1997;**9**(4): 855–79.

Patterson 1989
Patterson GR, DeBaryshe D, Ramsey E. A developmental perspective on antisocial behavior. *American Psychiatry* 1989;**44**(2):329–35.

Patterson 1993
Patterson GR, Dishion TJ, Chamberlain P. Outcomes and methodological issues relating to treatment of antisocial children. In: Giles TR editor(s). *Handbook of Effective Psychotherapy*. New York: Plenum Press, 1993.

Prinz 2009
Prinz RJ, Sanders MR, Shapiro CJ, Whitaker DJ, Lutzker JR. Population-Based Prevention of Child Maltreatment:The U.S. Triple P System Population Trial. *Prevention Science* 2009;**10**(1):1–12. [DOI: 10.1007/s11121-009-0123-3]

Pugh 1994
Pugh G, De'Ath E, Smith C. *Confident Parents, confident children: Policy and practice in parent education and support*. London: National Children's Bureau, 1994.

RevMan 2008
The Nordic Cochrane Centre, The Cochrane Collaboration. Review Manager (RevMan). 5.0. Copenhagen: The Nordic Cochrane Centre, The Cochrane Collaboration, 2008.

Robins 1990
Robins LN, Rutter M, (eds). *Straight and devious pathways from childhood to adulthood*. Cambridge: Cambridge University Press, 1990.

Robins 1991
Robins LN. Conduct disorder. *Journal of Child Psychology and Psychiatry* 1991;**32**(1):193–212.

Rose 1974
Rose SD. Group training of parents as behaviour modifiers. *Social Work* 1974;**19**(2):156–62.

Rutter 1996
Rutter M. Connections between child and adult psychopathology. *European Child and Adolescent Psychiatry* 1996(a);**5**(Suppl 1):4–7.

Sanders 2002
Sanders MR, Turner KM, Markie-Dadds C. The Development and Dissemination of theTriple P-Positive Parenting Program: A Multilevel,Evidence-Based System of Parenting and Family Support. *Prevention Science* 2002;**3** (3):173–89. [DOI: 10.1023/A:1019942516231]

Sanders 2008
Sanders M. Triple P-Positive Parenting Program as a public health approach to strengthening parenting. *Journal of Family Psychology* 2008;**22**(4):505–17.

Schore 1994
Schore A. *Affect regulation and the origin of the self: the neurobiology of emotional development*. Erlbaum: Mahwah, NJ, 1994.

Shaw 2001
Shaw DJ, Owens EB, Giovannelli J, Winstow EB. Infant and toddler pathways leading to early externalising disorders. *Journal of the American Academy of Child and Adolescent Psychiatry* 2001;**40**(1):36–43.

Sorh-Preston 2006
Sohr-Preson SL, Scaramella LV. Implications of timing of maternal depressive symptoms for early cognitive and

language development. *Clinical Child and Family Psychology Review* 2006;**9**(1):65–83.

Sroufe 1996
Sroufe AL. *Emotional development: the organization of emotional life in the early years*. Cambride, UK: Cambridge University Press, 1996.

Sroufe 2005
Sroufe LA, Egeland B, Carlson E, Colllins AW. *The development of the person: The Minnesota study of risk and adaptation from birth to adulthood*. New York: The Guilford Press, 2005.

St James-Roberts 1994
St James-Roberts I, Singh G, Lynn R, Jackson S. Assessing emotional and behavioural problems in reception class school-children: factor structure, convergence and prevalence using PBCL. *British Journal of Educational Psychology* 1994;**64**(1):105–18.

Steele 1996
Steele H, Steele M, Fonagy P. Associations among attachment classifications of mothers, fathers and infants. *Child Development* 1996;**67**(2):541–55.

Strain 1981
Strain PS, Young CC, Horowitz J. Generalised behavior change during oppositional child training. *Behavior Modification* 1981;**5**:15–26.

Szyndler 1992
Szyndler J, Bell G. Are groups for parents of children with sleep problems effective?. *Health Visitor* 1992;**65**(8):277–9.

Velez 1989
Velez CT, Johnson J, Cohen P. A longitudinal analysis of selected risk factors for childhood psychopathology. *Journal of the American Academy of Child and Adolescent Psychiatry* 1989;**28**:861–4.

Vondara 2001
Vondara JL, Shaw DS, Swearingen L, Cohen M, Owens EB. Attachment stability and emotional and behavioral regulation from infancy to preschool age. *Development and Psychopathology* 2001;**13**(1):13–33.

Warren 1997
Warren SL, Huston L, Egeland B, Sroufe LA. Child and adolescent anxiety disorders and early attachment. *Journal of the American Academy of Child and Adolescent Psychiatry* 1997;**36**(5):637–44.

References to other published versions of this review

Barlow 2002
Barlow J, Parsons J. Group-based parent-training programmes for improving emotional and behavioural adjustment in 0-3 year old children. *Cochrane Database of Systematic Reviews* 2003, Issue 2. [DOI: 10.1002/14651858.CD003680]

Barlow 2003a
Barlow J, Parsons J. Group-based parent-training programmes for improving emotional and behavioural adjustment in 0-3 year old children (update). *Cochrane Database of Systematic Reviews* 2003, Issue 2. [DOI: 10.1002/14651858.CD003680]

* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Bradley 2003

Methods	Randomised controlled trial (with pre and post measures).
Participants	Participants were parents of preschoolers (three to four years of age) with behavioural problems, recruited through advertisements placed in community locations in metropolitan Toronto. Age range three to four years, mean age 43.6 months
Interventions	Participants were randomly assigned to two conditions (breakdown by groups not reported; breakdown by groups for completers provided) Intervention group (n=81 completers): There were seven to eight parents in each group. Participants watched the video 1-2-3 Magic during the first three sessions. This video provides simple clear strategies such as timeout and rewards to reduce coercive and conflicting patterns of parent child interaction and stresses importance of reducing nagging, yelling, hitting and critical and hostile comments. Handouts were also provided. The facilitators encouraged the group to explore strategies and support one another. The group intervention consisted of a two-hour group meeting once a week for three weeks, followed by a booster session four weeks after the third session. Control group (n=93 completers): WLC group received the delayed treatment (the same intervention) after the study has finished
Outcomes	**Outcome 1: Child's problematic behaviour - hostile/aggressive, anxious, and hyperactive/distractible** Outcome measure used: Preschool Behavior Questionnaire (PBQ) How obtained: parent self report (questionnaire). Times of measurement: at baseline, and at three months after the orientation for both groups **Outcome 2: Child characteristics - child temperament** Outcome measure used: Preschool Characteristics Questionnaire (PCQ) How obtained: parent self report (questionnaire). Times of measurement: at baseline, and at three months after the orientation for both groups Note: Parent mental health outcomes were also sought at baseline, and at three months after the orientation for both groups, the outcome measure used: Brief Symptom Inventory (BSI), obtained by parent self report (questionnaire). Parents handling of child's behaviour by the Parenting Scale (PS) (parent outcomes) were also sought at baseline, and at three months after the orientation for both groups Note: The initial 70 families who participated in the intervention (both experimental and control) were sent follow-up questionnaires after one year (please see page1173)
Notes	The authors appeared not to use an inclusion criteria threshold for dysfunctional parent child interaction which raises the question of how many parents (and in which group) needed an intervention at all. Important components of the intervention package were a video and handouts and it remains unclear how much of the treatment effect was

	attributable to these and how much to the group work component

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "The caregivers at all sites were randomly assigned in blocks of 6 and 10 to either the immediate intervention or a wait-list control condition" (page 1173) Comment: Not reported what random component was used to select random permuted blocks **Judgement** Unclear
Allocation concealment (selection bias)	Unclear risk	Comment: Not possible to conceal from participants and trial staff and outcome assessors who were the participants **Judgement** N/A
Blinding (performance bias and detection bias) All outcomes	Unclear risk	**a) of participants?** Comment: design of study means participants assigned to the wait list control condition would be aware that they had not received the immediate intervention **Judgement** N/A **b) of personnel?** Comment: design of study means personnel would be aware which group had been assigned to the immediate intervention condition **Judgement** N/A **c) of outcome assessors?** Comment: no information given. **Judgement** Unclear
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Exclusion from analyses: 24/222 participants who came to the orientation sessions were excluded as they did not attend the intervention. A total of 198 participants commenced the study Baseline sample (n=198): 89 in the intervention group; 109 in the control group. Posttest sample (n=174): 81 in the inter-

		vention group; 93 in the control group. Follow-up sample: 25/70. Missing outcomes due to attrition: Post-test: eight in the intervention group; 16 in the control group Missing at follow-up: 45. Comment: Data were analysed for the pre-test sample (n=198) and the post-test sample (n=174 completers). The abstract states that data were analysed 'using an intention-to-treat analysis'. No further information was given about missing data. It is unclear whether outcome data were adequately addressed **Judgement** Unclear = uncertain risk of bias
Selective reporting (reporting bias)	High risk	Table 2 (page 1174) "outlines the F and P values for those variables found to be significant" Comment: Non-significant results were not reported. Selective reporting bias might be introduced **Judgement** No = inadequate/high risk of bias
Other bias	Low risk	Comment: The study appears to be free of other sources of bias Conflict of interest: not reported. **Judgement** Yes = adequate/low risk of bias

Cummings 2000

Methods	Randomised controlled trial (with pre and post measures).
Participants	Parents of two-and three-old children recruited from Children Health Centre (volunteers), Genesee county, Michigan. A flyer offering help with discipline, sleep difficulties, toiletting and reading to children was disseminated. No details given about pre-existing child behaviour problems. Age range two to three years, mean age not reported
Interventions	Participants were randomised one of two groups: Group based parent training (n=15 parents): Topics covered in the six sessions included positive attention and reinforcement; decreasing and eliminating problems behaviours; reading to children; sleep management and toilet training. Each of the following topics were covered in a one and a half-hour session. A 65-minute video, leader's guide, handouts and a book were used in the positive attention and reinforcement session

	Waiting list control (n=16 parents) Quote: "Because of parents' availability, parent training was provided for small groups of 2-6 parents, and in some cases training was done individually. Training took place both in agencies (97%) and homes (3%)" (page 40). Comment: Intervention was mainly group-based. The same intervention was individually delivered for some participant. It appeared that group(s) could consist of only two participants. For these reasons we decided to include this study in the review, and we consider the intervention in this study as the group-based intervention
Outcomes	**Outcome 1: Child behaviour** Outcome measure used: Dyadic Parent-Child Interacting Coding System (DPICS) child behaviours element How obtained: Video taped (through one way glass) three five minute sessions of semi structure activity including child directed play, parent directed play and clearing up (obtained by Principal Investigator) Times of measurement: the abstract states that testing was carried out at baseline, at post-treatment and at four-week follow-up. However, Table 2 (page 42) suggests that DPICS was carried out at post-test (at the end of training) only Any notes/limitations recorded by trial investigators: for child behaviours only deviant behaviours and compliance or non compliance with parent's commands were recorded **Outcome 2: Child cognitive development** Outcome measure used: Cognitive Abilities Scale-Second Edition (CAS-2) for 33 participants and Wechsler Pre-school and Primary Scale of Intelligence-Revised (WPPSI-R) for one participant How obtained: obtained by Principal Investigator. Times of measurement: at baseline, at post-treatment and at four-week follow-up Note: Wechsler Pre-school and Primary Scale of Intelligence-Revised (WPPSI-R), used for children aged four years or over. Only one child had turned four years at four week follow up and she was administered the WPPSI-R (page 39)
Notes	Quote: "21 parents were assigned to the treatment group (six also had been in the wait list control group), and 16 were assigned to the Wait List Control group" (page 41) Comment: six participants who were initially in the WLC group were admitted in subsequent cohorts and were included in the analysis twice over

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Quote: "After parents made contact with the researcher and expressed a desire to participate, they were randomly assigned, by flipping a coin, to either the Treatment group or a Wait List group?" (page 38) Comment: Participants who were initially assigned to the WLC group were offered the opportunity to participate in the treatment group after the first training series. Those who wanted to participate were

		placed in the treatment group in the next training series, while the new participants were randomly placed in either the treatment or wait list control group (see page 41 and Table 4, page 43) Participants who were initially randomly assigned to the WLC (n=6) were not randomly assigned to the further treatment groups; process of randomisation was compromised **Judgement** Unclear
Allocation concealment (selection bias)	Unclear risk	Comment: The process of allocation is not described. Insufficient information to make a judgment. **Judgement** Unclear
Blinding (performance bias and detection bias) All outcomes	Unclear risk	**a) of participants?** Comment: Design of study means that participants are likely to be aware of whether or not they had received the immediate intervention **Judgement :** N/A **b) of personnel?** Comment: Design of study means that the doctoral student (the only investigator) would always be aware of the allocation status **Judgement :** N/A **c) of outcome assessors?** Comment: Blinding process was impossible; there was no an independent assessor **Judgement :** N/A
Incomplete outcome data (attrition bias) All outcomes	High risk	Table 5, Table 7, Table 9 and Table 11 (pages 46-51) suggest that analyses were performed on completers Comment: No further information is given about missing data. Incomplete outcome data were not adequately addressed **Judgement** No: inadequate/high risk of bias
Selective reporting (reporting bias)	Low risk	Comment: All pre-specified outcomes were reported. **Judgement** Yes = adequate/low risk of bias

Cummings 2000 (*Continued*)

Other bias	Unclear risk	Quotes "the validity of parent's responses on the questionnaire may be questionable?" (page 56) "the six parents who first participated in the Wait List Control group, then in the Tretament group were counted twice for demographic purposes." (page 29) "researchers knew each child's assignment "examiner bias may have affected scoring for both groups of children" (page 61) Comment: Insufficient information to assess whether these items could introduce bias Conflict of interest: not reported. **Judgement** Unclear

Gross 1995

Methods	RCT (with pre and post measures).
Participants	Both parents of children filling criteria for behavioural difficulties. Twenty-three families referred from medical centre HMO and surrounding community. Age range 24 to 36 months, mean age not reported
Interventions	Participants were initially randomised to two conditions: i) intervention (18 families), and ii) WLC (6 families) Group parent training for 10 weeks (n=10); WL control one (n=6) control two (pulled out after allocation, n=7)
Outcomes	**Outcome 1** : Eyberg Child Behaviour Inventory. **Outcome 2** :Toddler Temperament Scale.
Notes	Secondary prevention. No details about random allocation.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Quotes: "Forty-six mothers and fathers and their toddlers were assigned to either an intervention or comparison group" (Abstract) "The 24 families were randomly assigned to the intervention or control groups; when notified of their group assignment, 7 families assigned to receive the intervention chose to withdraw; the 7

		withdrawing families were invited to remain as a second comparison group" (page 490) Comment: No further details. The sequence generation process is not described **Judgement** Unclear
Allocation concealment (selection bias)	Unclear risk	Comment: The method of concealment is not described. **Judgement** Unclear
Blinding (performance bias and detection bias) All outcomes	Unclear risk	**a) of participants?** Comment: Design of study means participants would be aware that they did not received the immediate intervention **Judgment** N/A **b) of personnel?** Comment: Design of study means personnel would be aware which group had been assigned to the immediate intervention condition **Judgment** N/A **c) of outcome assessors?** "Parent-child play sessions were videotaped and later coded using the DOPICS by two trained observers who were unaware of subjects' group assignments" (page 492) Comment: Outcome assessors were blinded for the 'Observed parent-toddler interaction' outcome **Judgement** Yes for the observational outcome. Unclear for outcomes reported by parents.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	10 weeks: Data reported on Self-Efficacy and Stress for 24 mothers and 24 fathers Data reported on Depression for 23 mothers and 23 fathers. Comment: No reason for missing data provided; However it looks as if ITT analyses for some outcomes were performed Quote: "Nine mothers (90%) attended more than half of the parent training groups and 7 (70%) completed at least half of the assigned homework. In contrast, only 6 (60%) fathers attended more than half of the parent training groups and 3

Gross 1995 (*Continued*)

		(30%) fathers attended fewer than 3 parent training groups. Only 2 (20%) fathers completed homework assessments at least half of the time, and 5 fathers (50%) never completed the homework" (page 493) Comment: A different dosage level of the intervention was provided for the participants, due to their non-compliance with the intervention **Judgement** Unclear
Selective reporting (reporting bias)	Low risk	Comment: Results are provided for all prospectively stated outcome measures **Judgement** Yes = adequate/low risk of bias
Other bias	Low risk	Comment: The study appears to be free of other sources of bias Conflict of interest: not reported. **Judgement** Yes = adequate/low risk of bias

Gross 2003

Methods	RCT (cluster-randomised trial with pre and post measures)
Participants	Parents of multiethnic toddlers (two to three years of age) in day care in low-income urban communities. Recruited from the general population of day care attenders. Mean age not reported
Interventions	Participants were randomised to one of four study conditions Group parent training (n=75); teacher training (n=52); combined parent and teacher training group (n=78); control group (n=59)
Outcomes	**Outcome 1:** Eyberg Child Behaviour Inventory **Outcome 2:** Kohns Problem Checklist **Outcome 3:** Dyadic Parent-Child Interactive Coding System - Revised
Notes	Secondary prevention. Random allocation, no other details.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Quote: 11 day care centres ..."were assigned to groups of centres so that the grouped centres were matched on day care size, eth-

		nic composition, percentage of single-parent families, median income, and day care centre quality. These grouped centres were than randomly assigned to one of three conditions: PT + TT (n=4), TT (n=4) or C (n= 3) conditions. C centres received no intervention for at least 1 years, after which new parents were recruited and these centres became PT centres" (page 263). Only results from participants in the groups they were randomised to were reported, it is unlikely that the randomisation was compromised by adding results from control participants who later received PT into the results of the original PT group Note: PT = parent training only; PT + TT = parent training delivered to parents and teachers in separate groups; TT = parent training delivered to teachers; C = no intervention waiting list control condition Comment: PT condition was not randomised in the first instance. The sequence generation process is not described. Insufficient information to make a judgement **Judgement** Unclear
Allocation concealment (selection bias)	Unclear risk	Comment: The method of concealment is not described **Judgement** Unclear
Blinding (performance bias and detection bias) All outcomes	Unclear risk	**a) of participants?** Comment: Design of study means participants could not easily have been blinded to their allocation **Judgment** N/A **b) of personnel?** Comment: Design of study means the trained group leaders would always be aware of the allocation status of the participant they were observing. No further information given regarding other personnel **Judgment** N/A **c) of outcome assessors?** Quote: "Videotaped play sessions were later coded by European American observers (in

		Seattle) who were blind to study hypotheses and participant's group assignment" (page 265) Comment: Outcome assessors were blinded for the 'Observer rated child behaviour problems' outcome **Judgement** Yes for the observational outcome. Unclear for outcomes reported by parents.
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Over the course of the study, 21.2% (n=56) of parents and 31.2% (n= 35) of teachers dropped out of the study. Among parents, 73.2% (n=41) of the attrition occurred between baseline and the first postintervention assessment; therefore, postintervention data are not available for these families. Another 10.7% (n=6) of the attrition occurred between the first postintervention assessment and the 6-month follow-up, and 16.1% (n=9) of the dropout occurred between the 6-month and the 1-year follow-up...Parents who dropped out of the study had significantly lower overactive discipline scores than parents who remained, t(262)=-2.48, p<0.05, indicating that dropouts were less likely to use harsh and coercive discipline strategies with their children than parents who were retained. Attrition was also related to parent ethnicity. Parents who remained in the study were more likely to be Latino, $x^2(1,N=262)=7.60$, p<0.01. Attrition was unrelated to other parent-child outcomes or demographic variables or to parent stress ...The growth care models presented in this article are based on 208 participants who remained in the study. To assess the effects of dropouts on the results on these analyses, we also run the final growth curve on the initial sample of 246 participants. The pattern of significant parameters remained unchanged as a result of using the larger sample. This indicate that participants attrition did not modify the interpretation of results (pages 266-277)." **Judgement** Yes = adequate/low risk of bias

Gross 2003 (*Continued*)

Selective reporting (reporting bias)	Low risk	Comment Results are provided for all prospectively stated outcome measures **Judgement** Yes = adequate/low risk of bias
Other bias	Low risk	Comment: The study appears to be free of other sources of bias Conflict of interest: not reported. **Judgement** Yes = adequate/low risk of bias

Hutchings 2007

Methods	RCT (pragmatic trial with pre and post measures, using a block design with allocation by area)
Participants	Participants were parents from socially disadvantaged families with a child aged three to four years; child should live with the primary carer, and should score above the clinical cut off on the Eyberg problem or intensity scale (11 or 127); primary carer should be able to attend group at the certain scheduled time. Participants were recruited from 11 Sure Start areas in north and mid-Wales. Mean age was 46.3 months In (Jones 2007), participants were drawn from an existing sample of 133 families randomised to two conditions on a 2:1 basis intervention or waiting list. The sample in this wider study was drawn from a sample of 255 families identified by their local health visitor, and who lived in 11 designated Sure Start areas in north and mid-Wales. Screening was carried out at baseline by parent report measure (ECBI and SDQ). To be eligible for this study, the parents must have rated their child's behaviour to be above the clinical cut-off on the problem of intensity subscale of the Eyberg Child Beahviour subscales or the hyperactivity subscale of the SDQ as observed by parent (page 751). in Jones 2007, the age range was three to four years, mean age 46.3 months
Interventions	Participants randomised to two conditions. In Jones 2007 participants were drawn from an existing sample of 133 families that had previously been randomised, 79 commenced Intervention group (104): The Webster-Stratton Incredible Years Basic parenting programme is a programme promoting positive parenting and improve parenting skills including establishing a positive relationship with the child through play and child centred activities; encouraging, rewarding and praising the child for appropriate behaviour; giving guidance in effective limit setting and strategies for managing non compliance A group based intervention was provided once a week over a 12-week period. Each group consists of maximum 12 parents, and each session lasted for 2 to 2.5 hours. Two trained leaders from different backgrounds (social workers, family support workers, health visitors, psychologists, etc.) held the sessions. The programme aims to promote positive parenting through: increasing positive child behaviour through praise and incentives; improving parent-child interaction; setting clear expectations and applying consistent gentle consequences for problem behaviour. The programme uses a number of methods including: role play; helping parents to identify social learning principles; modelling;

	discussion; skills practice and analysis of video material. The program promotes positive parenting and uses a collaborative approach (e.g. role play, modelling, discussion, etc). Control group (WLC) (n=49): WLC group received the delayed treatment (the same intervention) after the study has finished
Outcomes	**Outcome 1: child behaviour** **Conduct problems** i) Outcome measure used: Eyberg Child Behaviour Inventory-Problem (ECBI-P) scale How obtained: observed and reported by parents Times of measurement: at baseline, and at six months follow-up ii) Outcome measure used: Strengths and Difficulties Questionnaire (SDQ) scale How obtained: observed and reported by parents Times of measurement: at baseline, and at six months follow-up **Intensity of problem behaviour** Outcome measure used: Eyberg Child Behaviour Inventory-Intensity (ECBI-I) scale How obtained: observed and reported by parents Times of measurement: at baseline, and at six months follow-up **Hyperactivity** i) Outcome measure used: Strengths and Difficulties Questionnaire (SDQ) scale How obtained: observed and reported by parents Times of measurement: at baseline, and at six months follow-up ii) Outcome measure used: Conners abbreviated parent/ teacher rating scale How obtained: observed and reported by parents Times of measurement: at baseline, and at six months follow-up **Self control** Outcome measure used: Kendal self control rating scale How obtained: observed and reported by parents): Times of measurement: at baseline, and at six months follow-up **Child deviance** Outcome measure used: Strengths and Difficulties Questionnaire (SDQ) scale How obtained: observed and reported by parents Times of measurement: at baseline, and at six months follow-up **Outcome 2: Parent/child interaction - Child deviance** Outcome measure used: Dyadic parent-child interaction coding system How obtained: direct observation in participant's home by observers Times of measurement: at baseline, and at six months follow-up Note: The unit of randomisation was the parent-index child pair; parent involved in the study was mother or father; the reports obtained by parents have not presented separately for mothers and fathers In Jones 2007 (a subset of participants from the primary study) the following outcomes were assessed: **Outcome 1: ADHD symptoms** Outcome measure used: Conners Abbreviated Parent/teacher Rating Scale How obtained: observed by parent Times of measurement: at baseline and at six months follow-up **Outcome 2: Observations of mother and child behaviour** Outcome measure used: rating by the Dyadic Parent-Child Interaction Coding System

	(DPICS) How obtained: observed by trained staff Note: Times of measurement: 30 minute live home observation session at baseline and at six months follow-up, these were reported only as being used as a covariate in an ANCOVA of that Conners scores results (page 754)
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Quote: "Participants were blocked randomised by area. The unit of randomisation was the parent-index child pair. TB blindly and randomly allocated participants on 2:1 bases, after stratification by sex and age, using a random number generator" (Hutchings 2007, page 7597 and Jones 2007, page 752). Comment: Allocation sequence was adequately generated. **Judgment:** Yes = adequate/low risk of bias
Allocation concealment (selection bias)	Unclear risk	Comment: Participants were blindly allocated. Probably done, but the method of concealment is not described. Insufficient information to make a judgement. Quote: "Allocation was carried out after baseline assessment...The fourth author blindly, and randomly, allocated participants" (Jones 2007, pages 752-753). **Judgement** Unclear
Blinding (performance bias and detection bias) All outcomes	Low risk	a) of participants? Comment: Design of study means participants assigned to the WLC condition would be aware that they had not received the immediate intervention **Judgement** N/A **b) of personnel?** Comment: Design of study means personnel would be aware which group had been assigned to the immediate intervention condition. **Judgement**

		N/A **c) of outcome assessors?** Quote: "Researchers blind to allocation carried out the interviews and observations" (Hutchings 2007 page 7597), and Jones 2007, quote "Interviews and observations were carried out by researchers blind to participant allocation status at both time points to reduce bias" (page 753) Comment: For the outcomes observed and reported by parents the blinding was not applicable. However, for the observational outcome measures assessors were blinded **Judgment:** Yes
Incomplete outcome data (attrition bias) All outcomes	Low risk	In Hutchings 2007: quote: "86/104 (83%) in the treatment group completed trial (nine formally withdrew before intervention, nine could not be contacted at follow-up, from these only two went to group intervention session)...47 of 49 (96%) completed the trial (one formally withdrew before follow-up, one could not be contacted at follow-up (flow chart page 7596). We included the 20 lost participants in the intention to treat analysis (page 7596) The high loss to follow up rates in the intervention group is noted Comment: Incomplete data were adequately addressed. **Judgment:** Yes In Jones 2007, quote: "Inclusion of cases in the analyses was performed on an intention to treat basis. Attrition rates were generally low. Out of 79 families assessed at baseline, 71 (90%) completed follow-up assessment. Of those who failed to complete post-assessment, six were in the intervention group, and two in control group" (page 753) Comment: The reason for dropouts not given. However, intention-to-treat analyses were performed **Judgement** Yes = adequate/low risk of bias

Selective reporting (reporting bias)	Low risk	Comment: All prospectively stated outcomes were reported. **Judgment:** Yes = adequate/low risk of bias
Other bias	High risk	Quote: "Competing interests: JH is paid by Incredible Years for running occasional training courses in the delivery of the parent programme . . . " (page 7600) Comment: The principal investigator reports a conflict of interest which could potentially lead to pro-intervention bias in the language of the paper. This study appears to be free of other forms of bias Judgment: No, inadequate

Nicholson 1998

Methods	Controlled trial (with pre and post measures), with the sample that was partially randomised
Participants	Either or both parents of child one to five years, population sample of volunteers. Mean age 33.6 months
Interventions	Participants were randomised to one of two conditions. Group parent training for 10 hrs (n=20), WL control (n=20)
Outcomes	**Outcome 1**: Behaviour Screening Questionnaire.
Notes	Primary prevention. Allocation according to night preferred for intervention. Quote: "Two different week nights were offered to parents for attending classes; parent's choices for class nights were honored whenever possible. Those who indicated no preference were randomly assigned. One night comprised the parental-education group and the second night included a waiting list group. The waiting-list control group did not meet until the conclusion of the treated group's experience." (page 1108) Comment: This study could not be classified as quasi-RCT. However, some participants were randomly assigned, but we do not know the proportion of randomised participants and we are unlikely to get disaggregated data from the PI. It has been therefore decided that we keep the study in included, note the high risk of bias, and do a sensitivity analysis without it and report the findings in results and discuss in the Discussion.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**

Random sequence generation (selection bias)	High risk	Quote: "Two different week nights were offered to parents for attending classes; parent's choices for class nights were honored whenever possible. Those who indicated no preference were randomly assigned. One night comprised the parental-education group and the second night included a waiting list group. The waiting-list control group did not meet until the conclusion of the treated group's experience." (page 1108) Comment: This study could not be classified as quasi-RCT; however, some participants were randomly assigned; only randomly assigned sample could be included in our review; write to the author(s) and ask whether there are separate data for the randomly assigned sample **Judgement** No
Allocation concealment (selection bias)	High risk	Comment: The method of concealment is not described. **Judgement** No
Blinding (performance bias and detection bias) All outcomes	Unclear risk	Comment: Design of study means participants would be aware that they did not received the immediate intervention **Judgment** N/A **b) of personnel?** Comment: Design of study means personnel would be aware which group had been assigned to the immediate intervention condition **Judgment** N/A **c) of outcome assessors?** Comment: Not reported. **Judgement** Unclear
Incomplete outcome data (attrition bias) All outcomes	Low risk	Four weeks: "all parents completed the program through post-test" (page 1110); See Table 1 (page 1111) "Average attendance at the classes for the parental-education group was 83% (range= 50 to 100%)"

Nicholson 1998 (*Continued*)

		Comment: No missing outcome data **Judgement** Yes = adequate/low risk of bias
Selective reporting (reporting bias)	Low risk	Comment: Results are provided for all prospectively stated outcome measures **Judgement** Yes = adequate/low risk of bias
Other bias	Low risk	Comment: The study appears to be free of other sources of bias Conflict of interest: not reported. **Judgement** Yes = adequate/low risk of bias

Nicholson 2002

Methods	RCT (with pre and post measures).
Participants	Mothers, fathers and grandmothers of children one to five years, self-referred or referred by teachers. Mean age 37 months
Interventions	Participants were randomised to one of two conditions. Group parent training for 10 hours (n=13), WL control (n=13)
Outcomes	**Outcome 1** : Behaviour Screening Questionnaire. **Outcome 2** : Eyberg Child Behaviour Inventory. **Outcome 3** : Sutter-Eyberg Student Behaviour Inventory. **Outcome 4** : Pediatric Screening Checklist.
Notes	Secondary prevention. Random allocation, no other details.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Quote: "Parents eligible for the program were randomly assigned to either an experimental or wait-list control group" (page 366) Comment: No further details. The sequence generation process is not described **Judgement** Unclear
Allocation concealment (selection bias)	Unclear risk	Comment: The method of concealment is not described. **Judgement**

Nicholson 2002 (*Continued*)

		Unclear
Blinding (performance bias and detection bias) All outcomes	Unclear risk	Comment: Design of study means participants would be aware that they did not received the immediate intervention **Judgment** N/A **b) of personnel?** Comment: Design of study means personnel would be aware which group had been assigned to the immediate intervention condition **Judgment** N/A **c) of outcome assessors?** Comment: Not reported **Judgement** Unclear
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "Missed sessions were rescheduled to ensure that each parent consistently received the entire psycoeducational parenting program" (page 366) Comment:no information provided about numbers of participants by treatment group **Judgement** No = high risk of bias
Selective reporting (reporting bias)	Low risk	Comment: Results are provided for all prospectively stated outcome measures **Judgement** Yes = adequate/low risk of bias
Other bias	Low risk	Comment: The study appears to be free of other sources of bias Conflict of interest: not reported **Judgement** Yes = adequate/low risk of bias

Sutton 1992

Methods	Quasi-randomised controlled trial (with pre and post measures)
Participants	41 parents of preschool children either referred or self-referred. Described as "difficult" page (page 118). Age range not reported, mean age 46 months
Interventions	Participants were randomised to one of four conditions. Group parent training (n=8) home visit (n=10) telephone (n=12) WL control (n=11)

Outcomes	**Outcome 1:** Child Behaviour Questionnaire **Outcome 2:** Home situations
Notes	Secondary prevention. Sequential allocation; original WLC included in analyses as experimental later

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	High risk	Quote: "The 37 families (39 children) were sequentially allocated to one of four groups: 1. Group method; 2. Home visit method; 3. Telephone method; 4. Waiting list control" (page 119) Comment: Quasi-RCT; participants were sequentially allocated. "Eleven of the 37 original families were... re allocated to active forms of the intervention" (page 121). Unlcear if these 11 families were randomly allocated to the intervention **Judgement** **No** = inadequate/high risk of bias
Allocation concealment (selection bias)	High risk	Comment: Quasi-RCT; no allocation concealment. **Judgement** **No** = inadequate/high risk of bias
Blinding (performance bias and detection bias) All outcomes	Unclear risk	**a) of participants?** Quote: "...they had been warned beforehand that some families would be asked to go on a waiting list" (page 121) Comment: Design of study means participants would be aware that they did not received the immediate intervention **Judgement** N/A **b) of personnel?** Comment: Design of study means personnel would be aware which group had been assigned to the immediate intervention condition **Judgment** N/A **c) of outcome assessors?** Comment: Not reported **Judgement** Unclear

Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Quotes: "Two families left the Spring cohort of the group method early in the study: both were travelling many miles to the University and in one instance the father of the family opposed to his wife's participation in the study. Five families dropped out during the period of in which they were on the waiting list, leaving a total of 30 sets of data. Although they had been warned beforehand that some families would be asked to go on a waiting list, this in fact proved a seriously de-motivating event for some families, and they did not respond to later invitation to take part" (page 121) "To summarize, 41 sets of data were available for analysis at pre-intervention, 39 were available at post intervention and, twelve to eighteen months later, at follow-up, 20 sets were available" (page 121) Comment: Due to reallocation of wait list participants, a participant family can have more than one set of data. It is unclear how many participants were assigned to each treatment group, further data was obtained from the study investigators **Judgement** Unclear.
Selective reporting (reporting bias)	Low risk	Comment: Results are provided for all prospectively stated outcome measures **Judgement** Yes = adequate/low risk of bias
Other bias	Low risk	Comment: The study appears to be free of other sources of bias Conflict of interest: not reported. **Judgement** Yes = adequate/low risk of bias

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Adesso 1981	Randomised, child age not birth to three years, control group meets inclusion criteria, group parent training
Barber 1992	Control group meets inclusion criteria, child age not birth to three years
Baydar 2003	Randomised; the children did not meet the age criterion (mean age greater than 3 years and 11 months. "The mean age of the group was 55.8 months (4.65 years) at the time of pre-intervention assessment" (Baydar 2008); a TAU control group ("Regular Head Star curriculum"); intervention was group-based
Bergan 1983	No standardised child outcome measures.
Bierman 2000	Child age not birth to three years, multi-modal, not solely group based
Bor 2002	Randomised; the children did meet the age criterion (the mean age of all children was under 3 years and 11 months); a WLC group; interventions were not group-based (10 or 12 sessions were delivered on an individual basis)
Brody 1985	Child age not birth to three years, no additional information
Brotman 2003	Randomised, report of a pilot study; the mean age of all children was under 3 years and 11 months; a no-treatment control group; the preventive intervention program consisted not only of group sessions (n=50) but also of individualised home visits (n=10)
Brotman 2005a	Randomised; the children did not meet the age criterion (Range: two years nine months to five years and three months); a no-intervention control group; intervention consisted not only of group sessions (n=22) but also of individualised home visits (n=10)
Brunk 1987	Randomised to either of two treatment conditions, child age not birth to three years
Caughy 2004	Randomised; the children meet the age criterion, a control group meets the inclusion criteria (a placebo control group); a type of control group not specified; intervention was not group-based (the intervention consisted of nine standard paediatric office visits and six home visits)
Cunningham 1995	RCT (block randomised). Group based training. Community intervention compared with clinic based intervention and waiting list control. Child age not 0-3 (mean age in community Intervention group 54.2 months; clinic Intervention 52.3 months; waiting list control group 54.1 months)
Dadds 1992	No control group. Child age not 0-3.
Drummond 2005	Randomised, dual treatment cross-over design; the children did not meet the age criterion (the mean age was 49.22 months); a type of control group not specified; intervention was not group-based
EHSRC 2001	Randomised; the children did meet the age criterion; control group; the intervention was not solely group-based ("Participation in group parenting activities was lower than participation in other key services. Overall, slightly more than half of the families reported that they had attended an Early

(*Continued*)

	Head Start group parenting activities by the time of the second follow-up", page 90)
Esdaile 1995	Child age two to three and a half years, intervention and control groups, further data not available from author
Fanning 2007	Randomised; the children did not meet the age criterion (three to five years old; the mean age was 56 months for the treatment group, and 55 months for the control group); a WLC group; intervention was group based
Farrar 2005	Randomised; the children meet the age criterion, a control group meets the inclusion criteria (a placebo control group), intervention was group based. no relevant outcome measures (all outcomes were related to the parent or parent's perception; not specific ratings of the child's emotional and behavioural adjustment)
Fleming 2002	Randomised; the children did not meet the age criterion (three to four years old, the mean age was 50 months); a normal service provision control group; no group-based intervention (intervention delivered individually in participants' homes)
Forgatch 1979	Randomised controlled trial, children aged three to five, parent training materials evaluated
Formiga 2004	Randomised; the children did meet the age criterion (the mean age was three months and six days); a normal service provision control group; it is not clear whether intervention was group-based
Hanisch 2006	Unclear from the abstract whether the study was RCT; the children did not meet the age criterion (range: three to six years); a no-treatment control group; a group-based intervention; the full paper was in German
Harris 1989	Child age not birth to three years.
Helfenbaum-Kun 2007	Randomised; the children did not meet the age criterion (the mean age was four years; range: three to five years); a no-treatment control group; intervention was group-based
James-Roberts 2001	Randomised; the children meet the age criterion; a TAU control group; intervention was not group-based (two interventions were delivered on an individual basis in participants' homes)
Kern 2007	Randomised, child age three to five years, the mean age for all children was 53.2 months (MCI) or 54.1 months (PE); a control group did not meet the inclusion criteria; parent education and individualised assessment-based intervention versus parent education
Lambermon 1989	Randomised, child age birth to three years, not group parent training
Letourneau 2001	Randomised; first study: the children met the age criterion (infants); second study: the range (three to four years) was within the age criterion, but the mean age of all children was not reported; a TAU control group; the intervention was not group-based (the intervention was individually delivered in participants' homes)
Love 2005	Randomised; the children met the age criterion; a normal service provision control group; not all programmes (n=17) were group based; some children included in the study had disability

(*Continued*)

Markie-Dadds 2006	Randomised; the children meet the age criterion (Range: two to five years; the mean age of children in intervention group was 42.91 months, and in control group was 43.26 months); WLC group; the intervention was not group-based (a self-administered behavioural family intervention program)
Mazza 2002	Randomised; the children meet the age criterion (the mean age of all children was nine months); a TAU control group; intervention no solely group-based (the intervention consisted of individual and group counselling, educational/vocational referrals, medical care and referrals, and housing and legal advocacy)
McBride 1991a	RCT with waiting list control group, group based parent training, no child outcome measures, child too old (range 25-64 months)
McDade 1998	Inappropriate outcome measures (not behavioural).
Mcgoey 2005	Randomised; the children did not meet the age criterion (the mean age was four years; range= three to five years); a TAU; intervention was group-based
Mendelsohn 2007	Randomised; the children did meet the age criterion (new born babies; the assessment took place at age 33 months); a TAU control group; the intervention was delivered on an individual basis during the paediatrician visits (30- to 45-minute sessions)
Minkovitz 2003	Randomised and quasi-randomised (six randomisation and nine quasi-randomisation sites); the children did meet the age criterion (newborns up to four weeks of age were enrolled at birth and followed up to age three years); a normal service provision control group; intervention was not group-based (the intervention consisted manly of visits with physician, home visits, etc; parents were also offered support and learning opportunities in groups, as a part of the intervention)
Moxley 1983	RCT, child age birth to three years, not group parent training
Neef 1995	Child age not birth to three years.
Nixon 2004	Randomised to two treatment condition or control group; the children did not meet the age criterion (the mean age was SDT group was 47.36 months, and for ABB group was 48.30 months); a no-treatment control group; intervention was not group-based
Nurcombe 1984	RCT, child age birth to three years, not group parent training
Ostergren 2003	Quasi-experimental design; the children meet the age criterion; a no-treatment control group; intervention was not group-based (participants received individualised or generic guidance)
Owen 2007	Not randomised; the children meet the age criterion (range; 27-64 months); a type of control group not specified; intervention was group-based
Perez-Nieves 2001	Not truly randomised: the two intervention arms of the study were randomised but the control group is partially a convenience sample of those who could not attend the intervention groups; the children meet the age criterion; a control group meets the inclusion criteria; intervention was group based

(*Continued*)

Pisterman 1989	RCT, a waiting list control, group based, child age not birth to three years
Plant 2007	Randomised, the children did not meet the age criterion, a waiting-list control group;the focus of the study were children with developmental disabilities
Puckering 1994	No child outcome measures, no control group.
Quinn 2007	Randomised, the children did not meet the age (mean age=4.95 years for intervention group; mean age=4.83 years for control group); a waiting-list control group, the intervention was group-based
Rapee 2005	Randomised; the children did not meet the age criterion (some children were older than five years; range: 36 to 62 months; the mean age of all children was 47.3 months in the intervention group, and 46.1 months in the control group); a no-treatment control group; the intervention was group-based
Roosa 1983	Not group parent training.
Routh 1995	Child age not birth to three years.
Sanders 2000	RCT, not group parent training.
Sanders 2004	Randomised; the children did not meet the age criterion (the mean of all children was 53.71 months in the SBFI control group, and 52.84 months in the EBFI group); a normal service provision control group; the intervention was group-based (the intervention consisted of four additional group sessions targeting the risk factors; the normal service provision intervention consisted of four group sessions and four individual telephone sessions; both the intervention and the control group received the normal service provision treatment)
Sanders 2007	Randomised to one of three intervention conditions or to a WLC condition; Range: 36 to 48 months at baseline; the mean of all children not reported; a WLC group; the interventions were not group-based (The interventions were : self-directed behavioural family therapy or the interventions delivered on a individual basis)
Schachman 2001	Randomised; participants were primiparous, expectant mothers, who were between 22 and 32 weeks gestation; a normal service provision control group; intervention was a group-based Baby Boot Camp (BBC) education program; the study did not include any outcomes measuring infant mental health
Shaw 2006	Randomised; the children did meet the age criterion (range: 17 to 26 months; the mean age of all children was 24.1 months); a no-treatment control group; the intervention was not group-based (the intervention was delivered on a individual basis at participants' homes)
Sheeber 1994	RCT, group-based parent training, waiting list control, child mean age four years
Shelton 2000	Follow up study.
Siegert 1980	RCT, no treatment control group, group based, child age not birth to three years

(*Continued*)

Sonuga-Barke 2001	Randomised; the children did meet the age criterion (three-year old children; the mean of all children did not reported); a WLC group; the intervention was not group-based (the intervention was delivered on a individual basis in participants' homes)
Sonuga-Barke 2004	Randomised; the children did meet the age criterion (three-year old children; the mean of all children did not reported); a WLC group; the intervention was not group-based (the intervention was delivered on a individual basis in participants' homes)
Strayhorn 1989	Child age ranged from two to five. Control group does not fit inclusion criteria
Tiedemann 1992	RCT, child age not birth to three years.
Truss 1977	In addition to the group-based intervention, booklets were mailed to parents in the experimental group on a monthly basis until the infant was 48 months of age
Turner 1994	Not group parent training.
Turner 2006	Randomised; the children did not meet the age criterion (range: two to six years); a WLC group; the intervention was not group-based (the intervention was delivered on a individual basis at primary care setting)
US Health Department 2001	Randomised; the children did meet the age criteria (12 months of age or younger at baseline); the type of control group was not reported; the intervention was not group-based
Webster-Stratton 2001	Randomised, the children did not meet the age criterion (four years old); two interventions were compared; group-based intervention was combined with some individually delivered sessions
Webster-Stratton1982b	Randomised (crossover trial); chid's mean age = 48.0 months for the treatment group, and child's mean age = 46.3 months for the control group; the mean age for all children involved in the study was 47.1 months (slightly above the age criterion); a WLC group; the intervention was group-based
Wint 1987	Not group parent training.

DATA AND ANALYSES

Comparison 1. Post intervention parent training versus control results from individual studies

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Child emotional and behavioural adjustment outcome measures	6		Std. Mean Difference (IV, Fixed, 95% CI)	Totals not selected
1.1 Behaviour Screening Questionnaire - parent report	2		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.2 ECBI intensity - mother report	2		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.3 ECBI problems - mother report	2		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.4 Toddler Temperament Scale - mother report	1		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.5 ECBI intensity - father report	1		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.6 ECBI problems - father report	1		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.7 Toddler Temperament Scale - father report	1		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.8 Child Behaviour Questionnaire	1		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.9 Home Situations Questionnaire	1		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.10 Pediatric Symptom Checklist - parent report	1		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.11 Pediatric Symptom Checklist - teacher report	1		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.12 Sutter-Eyberg Behaviour Inventory (Intensity) - teacher report	1		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.13 Sutter-Eyberg Behaviour Inventory (Problems) - teacher report	1		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.14 DPICS - Child negative behaviour: independent observer report for mother/child interaction	1		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.15 DPICS - Child negative behaviour: independent observer report for father/child interaction	1		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.16 DPICS - Negative child behaviour: independent observer for parent/child interaction	1		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]

1.17 ECBI - problem total	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.18 ECBI - intensity total	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.19 ECBI - oppositional	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.20 ECBI - inattentive	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.21 ECBI - conduct	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.22 Classroom Behaviour Problems (KPC)	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.23 Preschool Behaviour Questionnaire (total) at 3 months post intervention	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.24 Preschool Behaviour Questionnaire (hyper/distractible)	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.25 Preschool Characteristics Questionnaire (persistent/unstoppable)	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.26 Preschool Characteristics Questionnaire (negative adaptation and affect)	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.27 Preschool Characteristics Questionnaire (difficult)	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]

Comparison 2. Follow-up parent training versus control results from individual studies

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Child emotional and behavioural adjustment outcome measures	3		Std. Mean Difference (IV, Fixed, 95% CI)	Totals not selected
1.1 ECBI intensity: mother report	1		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.2 ECBI problems: mother report	1		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.3 Toddler Temperament Scale: mother report	1		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.4 ECBI intensity: father report	1		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.5 ECBI problems: father report	1		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.6 Toddler Temperament Scale: father report	1		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.7 DPICS - Child negative behaviour: independent observer report for mother/child interaction	1		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.8 DPICS - Child negative behaviour: independent observer report for father/child interaction	1		Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]

1.9 DPICS - Child negative behaviour: independent observer report for parent/child interaction	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.10 DPICS - Child deviance: independent observer report	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.11 ECBI - intensity	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.12 ECBI - total	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.13 ECBI - oppositional	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.14 ECBI - inattentive	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.15 ECBI - conduct	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.16 Classroom Behaviour Problems - KPC: teacher report	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.17 ECBI - conduct problem	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.18 ECBI - intensity of problem	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.19 SDQ - conduct problem	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.20 SDQ - hyperactivity	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.21 Conners - hyperactivity	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.22 Kendal - self control	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.23 SDQ - total child deviance	1	Std. Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]

Comparison 3. Meta-analysis of child emotional and behavioural adjustment outcome measures post intervention

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Emotional and behavioural adjustment outcome measures (2 BSQ & 2 EBCI-Intensity scales): parent report	6		Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.1 Emotional and behavioural adjustment outcome measures (2BSQ): parent report	6	410	Std. Mean Difference (IV, Fixed, 95% CI)	-0.25 [-0.45, -0.06]
1.2 Emotional and behavioural adjustment outcome measures (2BSQ): parent report (sensitivity analysis without Nicholson 1998)	5	370	Std. Mean Difference (IV, Fixed, 95% CI)	-0.20 [-0.40, 0.01]
1.3 Emotional and behavioural adjustment outcome measures (2BSQ): parent report (sensitivity analysis without Bradley 2003)	5	236	Std. Mean Difference (IV, Fixed, 95% CI)	-0.36 [-0.62, -0.10]

2 Emotional and behavioural adjustment outcome measures (1 BSQ & 3 ECBI-Intensity scales): parent report	6		Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
2.1 Emotional and behavioural adjustment outcome measures (ECBI intensity replaces BSQ): parent report	6	410	Std. Mean Difference (IV, Fixed, 95% CI)	-0.22 [-0.42, -0.03]
2.2 Emotional and behavioural adjustment outcome measures (sensitivity analysis without Nicolson 1998)	5	370	Std. Mean Difference (IV, Fixed, 95% CI)	-0.16 [-0.37, 0.04]
2.3 Emotional and behavioural adjustment outcome measures (sensitivity analysis without Bradley 2003)	5	236	Std. Mean Difference (IV, Fixed, 95% CI)	-0.30 [-0.57, -0.04]
3 Emotional and behavioural adjustment outcome measures (1BSQ & 3 ECBI problem scales): parent report	6		Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
3.1 Emotional and behavioural adjustment outcome measures (BSQ): parent report	6	410	Std. Mean Difference (IV, Fixed, 95% CI)	-0.20 [-0.40, -0.01]
3.2 Emotional and behavioural adjustment outcome measures (BSQ): parent report sensitivity analysis without Nicholson 1998	5	370	Std. Mean Difference (IV, Fixed, 95% CI)	-0.14 [-0.35, 0.06]
3.3 Emotional and behavioural adjustment outcome measures (BSQ): parent report sensitivity analysis without Bradley 2003	5	236	Std. Mean Difference (IV, Fixed, 95% CI)	-0.27 [-0.53, -0.01]
3.4 Emotional and behavioural adjustment outcome measures (subgroup analysis for primary (preventive) interventions)	3	200	Std. Mean Difference (IV, Fixed, 95% CI)	-0.21 [-0.49, 0.07]
3.5 Emotional and behavioural adjustment outcome measures (subgroup analysis for secondary and tertiary (existing problems) level programmes)	3	210	Std. Mean Difference (IV, Fixed, 95% CI)	-0.20 [-0.48, 0.07]
4 Emotional and behavioural adjustment outcome measures - independent observation	3	177	Std. Mean Difference (IV, Fixed, 95% CI)	-0.54 [-0.84, -0.23]

Comparison 4. Meta-analysis of child emotional and behavioural adjustment outcome measures follow-up data

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Emotional and behavioural adjustment outcome measures ECBI-I (intensity scales subgroup 1) - parent report	3	304	Std. Mean Difference (IV, Fixed, 95% CI)	-0.38 [-0.62, -0.15]
2 Emotional and behavioural adjustment outcome measures ECBI-P (problem scales subgroup 2) - parent report	3	304	Std. Mean Difference (IV, Fixed, 95% CI)	-0.28 [-0.51, -0.04]
3 Emotional and behavioural adjustment outcome measures - independent observation	3	304	Std. Mean Difference (IV, Fixed, 95% CI)	-0.19 [-0.42, 0.05]

Analysis 1.1. Comparison 1 Post intervention parent training versus control results from individual studies, Outcome 1 Child emotional and behavioural adjustment outcome measures.

Review: Group-based parent-training programmes for improving emotional and behavioural adjustment in children from birth to three years old

Comparison: 1 Post intervention parent training versus control results from individual studies

Outcome: 1 Child emotional and behavioural adjustment outcome measures

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Fixed,95% CI	Std. Mean Difference IV,Fixed,95% CI
1 Behaviour Screening Questionnaire - parent report						
Nicholson 1998	20	10.6 (2.2)	20	12.5 (2.5)		-0.79 [-1.44, -0.14]
Nicholson 2002	13	22.38 (4.87)	13	25.85 (3.74)		-0.77 [-1.58, 0.03]
2 ECBI intensity - mother report						
Gross 1995	11	119.5 (20.9)	6	111.3 (15.9)		0.40 [-0.60, 1.41]
Nicholson 2002	13	102.5 (45.76)	13	119.85 (26.84)		-0.45 [-1.23, 0.33]
3 ECBI problems - mother report						
Gross 1995	11	6.3 (4.2)	6	6.2 (8.1)		0.02 [-0.98, 1.01]
Nicholson 2002	13	15.62 (10.39)	13	18.92 (6.8)		-0.36 [-1.14, 0.41]
4 Toddler Temperament Scale - mother report						
Gross 1995	11	3.2 (0.4)	6	3.5 (0.2)		-0.82 [-1.87, 0.22]

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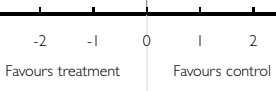
Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Fixed,95% CI	Std. Mean Difference IV,Fixed,95% CI
5 ECBI intensity - father report						
Gross 1995	11	91.5 (21.2)	6	112 (25.9)		-0.85 [-1.90, 0.20]
6 ECBI problems - father report						
Gross 1995	11	1.7 (2.1)	6	3.7 (4.8)		-0.58 [-1.60, 0.44]
7 Toddler Temperament Scale - father report						
Gross 1995	11	3.1 (0.4)	6	3.4 (0.6)		-0.60 [-1.62, 0.42]
8 Child Behaviour Questionnaire						
Sutton 1992	8	6 (2.7)	11	11.8 (4.2)		-1.51 [-2.57, -0.46]
9 Home Situations Questionnaire						
Sutton 1992	8	25.3 (14)	11	60.3 (30.4)		-1.34 [-2.37, -0.31]
10 Pediatric Symptom Checklist - parent report						
Nicholson 2002	13	55.31 (12.55)	13	60.46 (7.72)		-0.48 [-1.26, 0.30]
11 Pediatric Symptom Checklist - teacher report						
Nicholson 2002	13	47.09 (10.52)	13	53.46 (8.88)		-0.63 [-1.42, 0.16]
12 Sutter-Eyberg Behaviour Inventory (Intensity) - teacher report						
Nicholson 2002	13	69.54 (35.67)	13	97.46 (34.46)		-0.77 [-1.57, 0.03]
13 Sutter-Eyberg Behaviour Inventory (Problems) - teacher report						
Nicholson 2002	13	10.91 (10.19)	13	14 (8.81)		-0.31 [-1.09, 0.46]
14 DPICS - Child negative behaviour: independent observer report for mother/child interaction						
Gross 1995	11	6.4 (7.1)	6	10.3 (5.2)		-0.57 [-1.59, 0.45]
15 DPICS - Child negative behaviour: independent observer report for father/child interaction						
Gross 1995	11	8.2 (10.5)	6	6 (3.7)		0.24 [-0.76, 1.24]
16 DPICS - Negative child behaviour: independent observer for parent/child interaction						
Gross 2003	75	-0.9 (1.4)	59	-0.2 (1.3)		-0.51 [-0.86, -0.17]
17 ECBI - problem total						
Gross 2003	75	6.8 (7.5)	59	6.9 (7.8)		-0.01 [-0.35, 0.33]
18 ECBI - intensity total						
Gross 2003	75	97.3 (26.5)	59	100 (29.7)		-0.10 [-0.44, 0.25]
19 ECBI - oppositional						
Gross 2003	75	31.5 (10.7)	59	29.4 (9.3)		0.21 [-0.14, 0.55]
20 ECBI - inattentive						
Gross 2003	75	10.1 (4.2)	59	11.2 (5.6)		-0.22 [-0.57, 0.12]
21 ECBI - conduct						
Gross 2003	75	17.6 (6.9)	59	18.3 (7)		-0.10 [-0.44, 0.24]
22 Classroom Behaviour Problems (KPC)						
Gross 2003	75	17.9 (24.1)	59	30.6 (31.4)		-0.46 [-0.80, -0.11]



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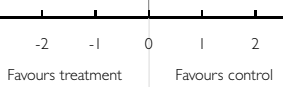
Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Fixed,95% CI	Std. Mean Difference IV,Fixed,95% CI
23 Preschool Behaviour Questionnaire (total) at 3 months post intervention						
Bradley 2003	81	15.76 (9.12)	93	16.7 (6.87)		-0.12 [-0.42, 0.18]
24 Preschool Behaviour Questionnaire (hyper/distractible)						
Bradley 2003	81	2.63 (2.02)	93	2.97 (1.9)		-0.17 [-0.47, 0.13]
25 Preschool Characteristics Questionnaire (persistent/unstoppable)						
Bradley 2003	81	4.43 (0.93)	93	4.5 (0.904)		-0.08 [-0.38, 0.22]
26 Preschool Characteristics Questionnaire (negative adaptation and affect)						
Bradley 2003	81	2.771 (0.797)	93	2.78 (0.728)		-0.01 [-0.31, 0.29]
27 Preschool Characteristics Questionnaire (difficult)						
Bradley 2003	81	3.461 (0.991)	93	3.73 (0.782)		-0.30 [-0.60, 0.00]



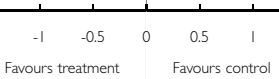
Analysis 2.1. Comparison 2 Follow-up parent training versus control results from individual studies, Outcome 1 Child emotional and behavioural adjustment outcome measures.

Review: Group-based parent-training programmes for improving emotional and behavioural adjustment in children from birth to three years old

Comparison: 2 Follow-up parent training versus control results from individual studies

Outcome: 1 Child emotional and behavioural adjustment outcome measures

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Fixed,95% CI	Std. Mean Difference IV,Fixed,95% CI
1 ECBI intensity: mother report						
Gross 1995	11	122.3 (25.2)	6	113 (25.8)		0.35 [-0.66, 1.35]
2 ECBI problems: mother report						
Gross 1995	11	5.5 (3.9)	6	4.2 (3.1)		0.34 [-0.67, 1.34]
3 Toddler Temperament Scale: mother report						
Gross 1995	11	3.1 (0.5)	6	3.5 (0.1)		-0.92 [-1.98, 0.13]
4 ECBI intensity: father report						
Gross 1995	11	122.3 (25.2)	6	113 (25.8)		0.35 [-0.66, 1.35]
5 ECBI problems: father report						
Gross 1995	11	3.4 (4.5)	6	2.8 (2.7)		0.14 [-0.85, 1.14]
6 Toddler Temperament Scale: father report						
Gross 1995	11	3.2 (0.3)	6	3.4 (0.3)		-0.63 [-1.66, 0.39]
7 DPICS - Child negative behaviour: independent observer report for mother/child interaction						
Gross 1995	11	5.5 (5.1)	6	15.3 (15.3)		-0.95 [-2.01, 0.11]
8 DPICS - Child negative behaviour: independent observer report for father/child interaction						
Gross 1995	11	5.6 (6.8)	6	5.5 (3.6)		0.02 [-0.98, 1.01]
9 DPICS - Child negative behaviour: independent observer report for parent/child interaction						
Gross 2003	75	-1.2 (1.3)	59	-1 (1.3)		-0.15 [-0.49, 0.19]
10 DPICS - Child deviance: independent observer report						
Hutchings 2007	104	15.6 (23.6)	49	19 (21.7)		-0.15 [-0.49, 0.19]
11 ECBI - intensity						
Gross 2003	75	90.9 (26.7)	59	97.1 (26.8)		-0.23 [-0.57, 0.11]
12 ECBI - total						
Gross 2003	75	5.4 (7.7)	59	6.8 (8.1)		-0.18 [-0.52, 0.17]
13 ECBI - oppositional						
Gross 2003	75	27.2 (10.3)	59	28.9 (10.3)		-0.16 [-0.51, 0.18]
14 ECBI - inattentive						
Gross 2003	75	9 (3.9)	59	10.3 (5.1)		-0.29 [-0.63, 0.05]



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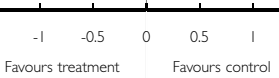
Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Fixed,95% CI	Std. Mean Difference IV,Fixed,95% CI
15 ECBI - conduct						
Gross 2003	75	17.5 (5.9)	59	18.6 (7.2)		-0.17 [-0.51, 0.17]
16 Classroom Behaviour Problems - KPC: teacher report						
Gross 2003	75	12.1 (12.3)	59	24.2 (23.8)		-0.66 [-1.01, -0.31]
17 ECBI - conduct problem						
Hutchings 2007	104	10.6 (7.9)	49	14.3 (8.6)		-0.45 [-0.80, -0.11]
18 ECBI - intensity of problem						
Hutchings 2007	104	122.3 (35.1)	49	144 (33)		-0.63 [-0.97, -0.28]
19 SDQ - conduct problem						
Hutchings 2007	104	4.1 (2.3)	49	4.7 (2.1)		-0.27 [-0.61, 0.07]
20 SDQ - hyperactivity						
Hutchings 2007	104	5.2 (2.8)	49	6.7 (2.5)		-0.55 [-0.90, -0.21]
21 Conners - hyperactivity						
Hutchings 2007	104	12.3 (7.5)	49	16 (6.9)		-0.50 [-0.85, -0.16]
22 Kendal - self control						
Hutchings 2007	104	114 (29.9)	49	124.8 (24.4)		-0.38 [-0.72, -0.04]
23 SDQ - total child deviance						
Hutchings 2007	104	14.1 (6.4)	49	16.4 (6.6)		-0.35 [-0.70, -0.01]

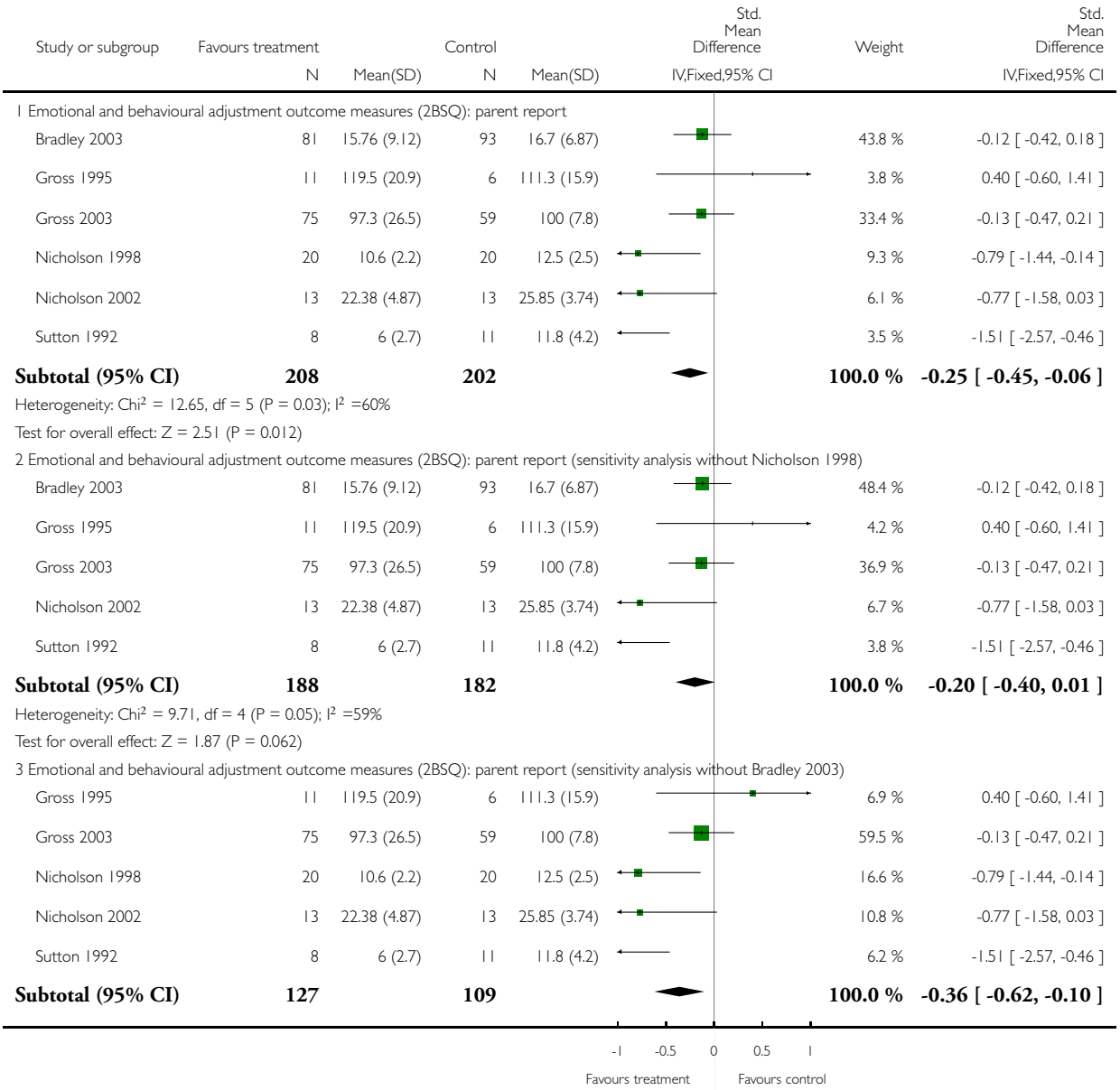


Analysis 3.1. Comparison 3 Meta-analysis of child emotional and behavioural adjustment outcome measures post intervention, Outcome 1 Emotional and behavioural adjustment outcome measures (2 BSQ & 2 EBCI-Intensity scales): parent report.

Review: Group-based parent-training programmes for improving emotional and behavioural adjustment in children from birth to three years old

Comparison: 3 Meta-analysis of child emotional and behavioural adjustment outcome measures post intervention

Outcome: 1 Emotional and behavioural adjustment outcome measures (2 BSQ % 2 EBCI-Intensity scales): parent report



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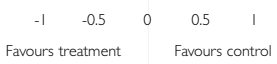
Study or subgroup	Favours treatment		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Fixed,95% CI		IV,Fixed,95% CI
Heterogeneity: Chi² = 11.23, df = 4 (P = 0.02); I² =64%							
Test for overall effect: Z = 2.67 (P = 0.0075)							
Test for subgroup differences: Chi² = 0.89, df = 2 (P = 0.64), I² =0.0%							



Analysis 3.2. Comparison 3 Meta-analysis of child emotional and behavioural adjustment outcome measures post intervention, Outcome 2 Emotional and behavioural adjustment outcome measures (1 BSQ & 3 ECBI-Intensity scales): parent report.

Review: Group-based parent-training programmes for improving emotional and behavioural adjustment in children from birth to three years old

Comparison: 3 Meta-analysis of child emotional and behavioural adjustment outcome measures post intervention

Outcome: 2 Emotional and behavioural adjustment outcome measures (1 BSQ % 3 ECBI-Intensity scales): parent report

Study or subgroup	Treatment		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Fixed,95% CI		IV,Fixed,95% CI
1 Emotional and behavioural adjustment outcome measures (ECBI intensity replaces BSQ): parent report							
Bradley 2003	81	15.76 (9.12)	93	16.7 (6.87)		43.7 %	-0.12 [-0.42, 0.18]
Gross 1995	11	119.5 (20.9)	6	111.3 (15.9)		3.8 %	0.40 [-0.60, 1.41]
Gross 2003	75	97.3 (26.5)	59	100 (29.7)		33.3 %	-0.10 [-0.44, 0.25]
Nicholson 1998	20	10.6 (2.2)	20	12.5 (2.5)		9.3 %	-0.79 [-1.44, -0.14]
Nicholson 2002	13	102.5 (45.76)	13	119.85 (26.84)		6.4 %	-0.45 [-1.23, 0.33]
Sutton 1992	8	6 (2.7)	11	11.8 (4.2)		3.5 %	-1.51 [-2.57, -0.46]
Subtotal (95% CI)	**208**		**202**			**100.0 %**	**-0.22 [-0.42, -0.03]**
Heterogeneity: Chi² = 11.50, df = 5 (P = 0.04); I² =57%							
Test for overall effect: Z = 2.21 (P = 0.027)							
2 Emotional and behavioural adjustment outcome measures (sensitivity analysis without Nicolson 1998)							
Bradley 2003	81	15.76 (9.12)	93	16.7 (6.87)		48.2 %	-0.12 [-0.42, 0.18]

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Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Fixed,95% CI	Weight	Std. Mean Difference IV,Fixed,95% CI
Gross 1995	11	119.5 (20.9)	6	111.3 (15.9)		4.2 %	0.40 [-0.60, 1.41]
Gross 2003	75	97.3 (26.5)	59	100 (29.7)		36.8 %	-0.10 [-0.44, 0.25]
Nicholson 2002	13	102.5 (45.76)	13	119.85 (26.84)		7.0 %	-0.45 [-1.23, 0.33]
Sutton 1992	8	6 (2.7)	11	11.8 (4.2)		3.8 %	-1.51 [-2.57, -0.46]
Subtotal (95% CI)	**188**		**182**			**100.0 %**	**-0.16 [-0.37, 0.04]**
Heterogeneity: Chi^2 = 8.22, df = 4 (P = 0.08); I^2 =51%							
Test for overall effect: Z = 1.55 (P = 0.12)							
3 Emotional and behavioural adjustment outcome measures (sensitivity analysis without Bradley 2003)							
Gross 1995	11	119.5 (20.9)	6	111.3 (15.9)		6.8 %	0.40 [-0.60, 1.41]
Gross 2003	75	97.3 (26.5)	59	100 (29.7)		59.2 %	-0.10 [-0.44, 0.25]
Nicholson 1998	20	10.6 (2.2)	20	12.5 (2.5)		16.5 %	-0.79 [-1.44, -0.14]
Nicholson 2002	13	102.5 (45.76)	13	119.85 (26.84)		11.3 %	-0.45 [-1.23, 0.33]
Sutton 1992	8	6 (2.7)	11	11.8 (4.2)		6.1 %	-1.51 [-2.57, -0.46]
Subtotal (95% CI)	**127**		**109**			**100.0 %**	**-0.30 [-0.57, -0.04]**
Heterogeneity: Chi^2 = 10.64, df = 4 (P = 0.03); I^2 =62%							
Test for overall effect: Z = 2.27 (P = 0.023)							
Test for subgroup differences: Chi^2 = 0.67, df = 2 (P = 0.71), I^2 =0.0%							

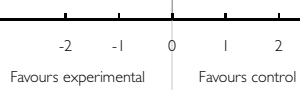
Analysis 3.3. Comparison 3 Meta-analysis of child emotional and behavioural adjustment outcome measures post intervention, Outcome 3 Emotional and behavioural adjustment outcome measures (1BSQ & 3 ECBI problem scales): parent report.

Review: Group-based parent-training programmes for improving emotional and behavioural adjustment in children from birth to three years old

Comparison: 3 Meta-analysis of child emotional and behavioural adjustment outcome measures post intervention

Outcome: 3 Emotional and behavioural adjustment outcome measures (1BSQ % 3 ECBI problem scales): parent report

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Fixed,95% CI	Weight	Std. Mean Difference IV,Fixed,95% CI
1 Emotional and behavioural adjustment outcome measures (BSQ): parent report							
Sutton 1992	8	6 (2.7)	11	11.8 (4.2)		3.5 %	-1.51 [-2.57, -0.46]
Nicholson 1998	20	10.6 (2.2)	20	12.5 (2.5)		9.3 %	-0.79 [-1.44, -0.14]
Nicholson 2002	13	15.62 (10.39)	13	18.92 (6.8)		6.4 %	-0.36 [-1.14, 0.41]
Bradley 2003	81	15.76 (9.12)	93	16.7 (6.87)		43.6 %	-0.12 [-0.42, 0.18]
Gross 2003	75	6.8 (7.5)	59	6.9 (7.8)		33.3 %	-0.01 [-0.35, 0.33]
Gross 1995	11	6.3 (4.2)	6	6.2 (8.1)		3.9 %	0.02 [-0.98, 1.01]
Subtotal (95% CI)	**208**		**202**			**100.0 %**	**-0.20 [-0.40, -0.01]**
Heterogeneity: Chi² = 10.93, df = 5 (P = 0.05); I² =54%							
Test for overall effect: Z = 2.03 (P = 0.042)							
2 Emotional and behavioural adjustment outcome measures (BSQ): parent report sensitivity analysis without Nicholson 1998							
Sutton 1992	8	6 (2.7)	11	11.8 (4.2)		3.8 %	-1.51 [-2.57, -0.46]
Nicholson 2002	13	15.62 (10.39)	13	18.92 (6.8)		7.1 %	-0.36 [-1.14, 0.41]
Bradley 2003	81	15.76 (9.12)	93	16.7 (6.87)		48.1 %	-0.12 [-0.42, 0.18]
Gross 2003	75	6.8 (7.5)	59	6.9 (7.8)		36.7 %	-0.01 [-0.35, 0.33]
Gross 1995	11	6.3 (4.2)	6	6.2 (8.1)		4.3 %	0.02 [-0.98, 1.01]
Subtotal (95% CI)	**188**		**182**			**100.0 %**	**-0.14 [-0.35, 0.06]**
Heterogeneity: Chi² = 7.44, df = 4 (P = 0.11); I² =46%							
Test for overall effect: Z = 1.36 (P = 0.17)							
3 Emotional and behavioural adjustment outcome measures (BSQ): parent report sensitivity analysis without Bradley 2003							
Sutton 1992	8	6 (2.7)	11	11.8 (4.2)		6.1 %	-1.51 [-2.57, -0.46]
Nicholson 1998	20	10.6 (2.2)	20	12.5 (2.5)		16.5 %	-0.79 [-1.44, -0.14]
Nicholson 2002	13	15.62 (10.39)	13	18.92 (6.8)		11.4 %	-0.36 [-1.14, 0.41]
Gross 2003	75	6.8 (7.5)	59	6.9 (7.8)		59.1 %	-0.01 [-0.35, 0.33]
Gross 1995	11	6.3 (4.2)	6	6.2 (8.1)		6.9 %	0.02 [-0.98, 1.01]
Subtotal (95% CI)	**127**		**109**			**100.0 %**	**-0.27 [-0.53, -0.01]**



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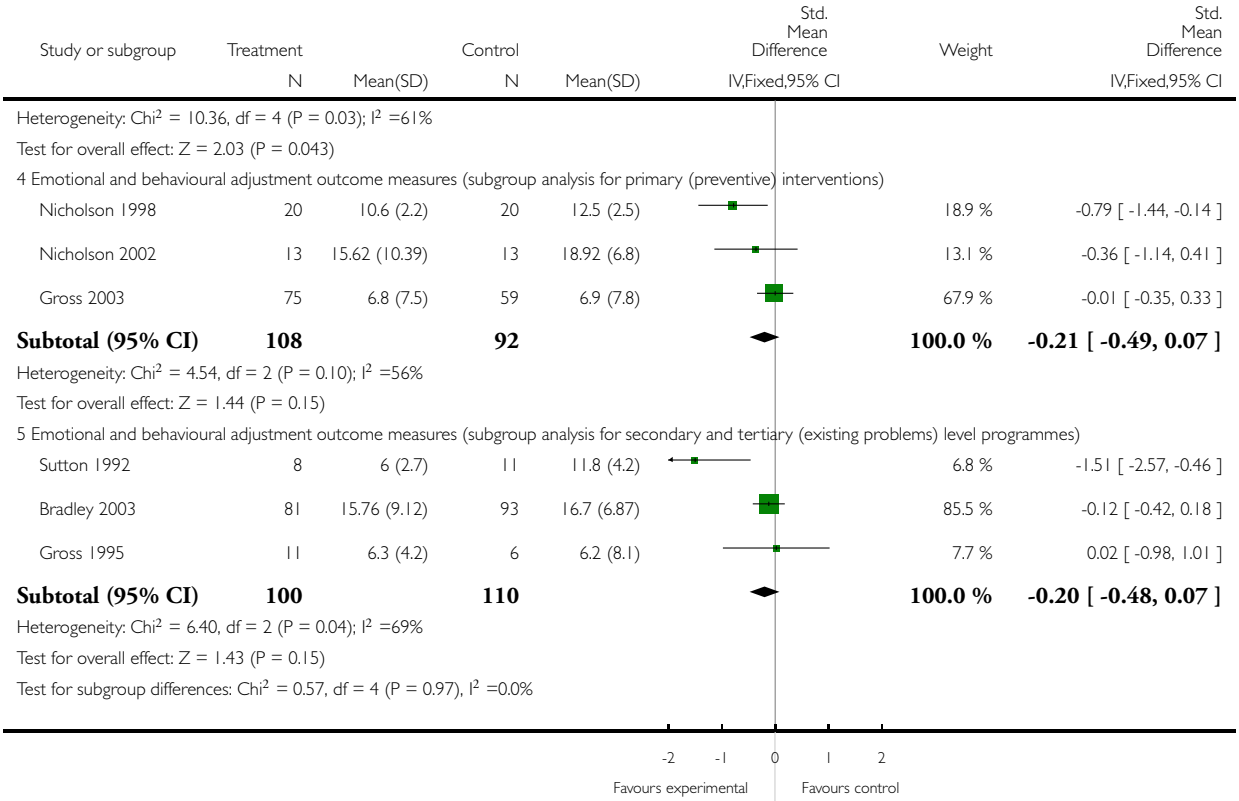


Analysis 3.4. Comparison 3 Meta-analysis of child emotional and behavioural adjustment outcome measures post intervention, Outcome 4 Emotional and behavioural adjustment outcome measures - independent observation.

Review: Group-based parent-training programmes for improving emotional and behavioural adjustment in children from birth to three years old

Comparison: 3 Meta-analysis of child emotional and behavioural adjustment outcome measures post intervention

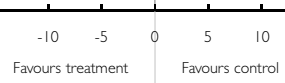
Outcome: 4 Emotional and behavioural adjustment outcome measures - independent observation

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Fixed,95% CI	Weight	Std. Mean Difference IV,Fixed,95% CI
Gross 1995	11	6.4 (7.1)	6	10.3 (5.2)		8.9 %	-0.57 [-1.59, 0.45]
Gross 2003	75	-0.9 (1.4)	59	-0.2 (1.3)		76.5 %	-0.51 [-0.86, -0.17]
Nicholson 2002	13	47.09 (10.52)	13	53.46 (8.88)		14.7 %	-0.63 [-1.42, 0.16]
Total (95% CI)	**99**		**78**			**100.0 %**	**-0.54 [-0.84, -0.23]**

Heterogeneity: $Chi^2 = 0.08$, df = 2 (P = 0.96); $I^2 = 0.0\%$

Test for overall effect: Z = 3.46 (P = 0.00054)

Test for subgroup differences: Not applicable



Analysis 4.1. Comparison 4 Meta-analysis of child emotional and behavioural adjustment outcome measures follow-up data, Outcome 1 Emotional and behavioural adjustment outcome measures ECBI-I (intensity scales subgroup 1) - parent report.

Review: Group-based parent-training programmes for improving emotional and behavioural adjustment in children from birth to three years old

Comparison: 4 Meta-analysis of child emotional and behavioural adjustment outcome measures follow-up data

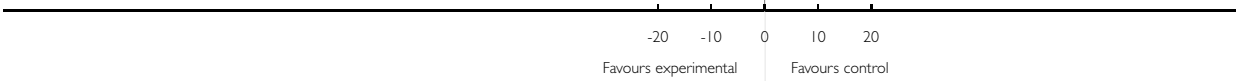
Outcome: 1 Emotional and behavioural adjustment outcome measures ECBI-I (intensity scales subgroup 1) - parent report

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Fixed,95% CI	Weight	Std. Mean Difference IV,Fixed,95% CI
Gross 1995	11	122.3 (25.2)	6	113 (25.8)		5.6 %	0.35 [-0.66, 1.35]
Gross 2003	75	90.9 (26.7)	59	97.1 (26.8)		47.9 %	-0.23 [-0.57, 0.11]
Hutchings 2007	104	122.3 (35.1)	49	144 (33)		46.6 %	-0.63 [-0.97, -0.28]
Total (95% CI)	**190**		**114**			**100.0 %**	**-0.38 [-0.62, -0.15]**

Heterogeneity: Chi^2 = 4.69, df = 2 (P = 0.10); I^2 =57%

Test for overall effect: Z = 3.17 (P = 0.0015)

Test for subgroup differences: Not applicable



Analysis 4.2. Comparison 4 Meta-analysis of child emotional and behavioural adjustment outcome measures follow-up data, Outcome 2 Emotional and behavioural adjustment outcome measures ECBI-P (problem scales subgroup 2) - parent report.

Review: Group-based parent-training programmes for improving emotional and behavioural adjustment in children from birth to three years old

Comparison: 4 Meta-analysis of child emotional and behavioural adjustment outcome measures follow-up data

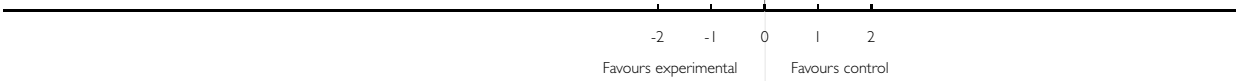
Outcome: 2 Emotional and behavioural adjustment outcome measures ECBI-P (problem scales subgroup 2) - parent report

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Fixed,95% CI	Weight	Std. Mean Difference IV,Fixed,95% CI
Gross 1995	11	5.5 (3.9)	6	4.2 (3.1)		5.5 %	0.34 [-0.67, 1.34]
Gross 2003	75	5.4 (7.7)	59	6.8 (8.1)		47.5 %	-0.18 [-0.52, 0.17]
Hutchings 2007	104	10.6 (7.9)	49	14.3 (8.6)		47.0 %	-0.45 [-0.80, -0.11]
Total (95% CI)	**190**		**114**			**100.0 %**	**-0.28 [-0.51, -0.04]**

Heterogeneity: Chi^2 = 2.78, df = 2 (P = 0.25); I^2 =28%

Test for overall effect: Z = 2.32 (P = 0.021)

Test for subgroup differences: Not applicable

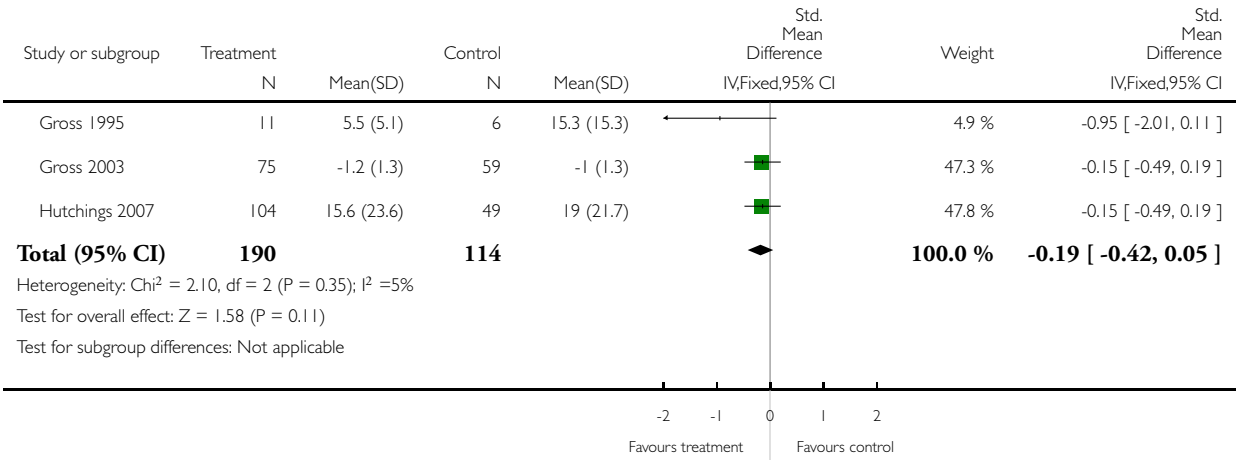


Analysis 4.3. Comparison 4 Meta-analysis of child emotional and behavioural adjustment outcome measures follow-up data, Outcome 3 Emotional and behavioural adjustment outcome measures - independent observation.

Review: Group-based parent-training programmes for improving emotional and behavioural adjustment in children from birth to three years old

Comparison: 4 Meta-analysis of child emotional and behavioural adjustment outcome measures follow-up data

Outcome: 3 Emotional and behavioural adjustment outcome measures - independent observation



ADDITIONAL TABLES

Table 1. Content of the parenting programmes

Study	Content
Gross 1995	Group-based parenting programme delivered over the course of 10 weeks and developed by Webster-Stratton using self-efficacy theory. Parents learn through mastery experiences, viewing and discussing vignettes of parent and child models, and mutual support and reinforcement among group participants. The programme includes information on a) how to play with your child, b) helping your child learn, c) using praise and rewards effectively, d) strategies for setting limits effectively, and e) managing misbehaviour. Groups were led by psychiatric nurses
Nicholson 1998	A 10-hour group-based educational parenting programme specifically designed for parents of children one to five years, based on well-established knowledge and practices of parenting drawn from the literature on child development, cognitive psychology and social learning theory. The programme comprises four major components, represented by the STAR acronym. The first encouraged parents to stop and think (S and T in the acronym) before responding to their child's behaviours. The second focused on parents questioning their expectations of their child (A for ask in the acronym). The third dealt with nurturing strategies for encourage development, and the fourth dealt with discipline and setting limits on children's behaviour (R for respond in the acronym). The programme was delivered by parent educators

Table 1. Content of the parenting programmes (*Continued*)

Nicholson 2002	A psychoeducational programme using the STAR parenting programme (as described in Nicholson 1998). Training delivered by facilitators trained in the STAR Programme
Sutton 1992	Group-based parenting programme delivered over the course of eight weeks, based on the principles of social learning theory. The programme was developed by the author and focused on parents learning child-management skills. The parents aimed to obtain their child's compliance with an instruction within one minute of receiving it. The training was delivered by the author
Gross 2003	Group-based parenting programme (The Incredible Years BASIC Programme) delivered to groups of 8 to 12 parents in two-hour sessions over the course of 12 weeks. Topics covered included child-directed play, helping young children learn, using praise and rewards, effective limit setting, handling misbehaviour and problem solving. Home work assignments were also used. The course was taught using video vignettes which were appropriate for toddlers
Bradley 2003	A video group-based training. There were seven to eight parents in each group. Participants watched the video 1-2-3 Magic during the first three sessions. This video provides simple clear strategies such as timeout and rewards to reduce coercive and conflicting patterns of parent child interaction and stresses importance of reducing nagging, yelling, hitting and critical and hostile comments. Handouts were also provided. The facilitators encouraged the group to explore strategies and support one another. The group intervention consisted of a two-hour group meeting once a week for three weeks, followed by a booster session four weeks after the third session.
Cummings 2000	Group based behaviour programme using video and other educational material. Topics covered in the six sessions included positive attention and reinforcement; decreasing and eliminating problems behaviours; reading to children; sleep management and toilet training. Each of the following topics were covered in a one and a half hour session. A 65-minute video, leader's guide, handouts and a book were used in the positive attention and reinforcement session
Hutchings 2007	The Webster-Stratton Incredible Years Basic parenting programme is a programme promoting positive parenting and improve parenting skills including establishing a positive relationship with the child through play and child centred activities; encouraging, rewarding and praising the child for appropriate behaviour; giving guidance in effective limit setting and strategies for managing non compliance A group based intervention was provided once a week over a 12-week period. Each group consists of maximum 12 parents, and each session lasted for two to two and a half hours. Two trained leaders from different backgrounds (social workers, family support workers, health visitors, psychologists, etc.) held the sessions. The programme aims to promote positive parenting through: increasing positive child behaviour through praise and incentives; improving parent-child interaction; setting clear expectations and applying consistent gentle consequences for problem behaviour. The programme uses a number of methods including: role play; helping parents to identify social learning principles; modelling; discussion; skills practice and analysis of video material. The program promotes positive parenting and uses a collaborative approach (e.g. role play, modelling, discussion, etc.).

Table 2. Outcomes and outcome measures (included studies)

Main outcome	Sub outcome	Characteristic	Measurement instrument	How obtained	Study	Time measured	Notes	Used in meta-analysis

Table 2. Outcomes and outcome measures (included studies) *(Continued)*

Emotional and behavioural adjustment	**Child problematic behaviour**	Sleeping Temper tantrums Aggression Disobeying Not listening Whining	Behaviour Screening Questionnaire (BCQ) (Richman & Graham 1971)	Reported by parents	Nicholson 1998	Times of measurement: at baseline, at post-intervention, and at 6-week follow-up		**Post intervention**Parent report measurement used: Analysis 1.1 **Follow up** data not available for both the intervention and control group **Meta analysis:** post intervention data used: Analysis 3.1; Analysis 3.2; Analysis 3.3
Emotional and behavioural adjustment	Child problematic behaviour	Temper tantrum Toileting Eating	Behaviour Screening Questionnaire (BSQ) (Richman & Graham 1971)	Reported by parents	Nicholson 2002	Times of measurement: at baseline, at post intervention, and at 1 month follow-up		**Post intervention**Parent report measurement used: Analysis 1.1 **Follow up** data not available for both the intervention and control group **Meta analysis:** post intervention parent data used: Analysis: Analysis 3.1
Emotional and behavioural adjustment	Child problematic behaviour	Conduct problem	Child Behaviour Questionnaire (CBQ) (Rutter, Tiz-	Reported by parents (questionnaire)	Sutton 1992	Times of measurement: at baseline,		**Post intervention**Parent report mea-

Table 2. Outcomes and outcome measures (included studies) *(Continued)*

			zard & Whitmore, 1970)			at post intervention, and at 12-18 months follow-up		surement used: Analysis 1.1 **Follow up** data not available for both the intervention and control group **Meta analysis:** Post intervention parent data used: Analysis 3.1
Emotional and behavioural adjustment	Child problematic behaviour	Conduct problem	Eyberg Child Behaviour Inventory (ECBI-P) (Robinson et al 1980)	Reported by both parents	Gross 1995	Times of measurement: at baseline, at post intervention, and at 3 months follow-up		**Post intervention**Parent report measurement used: Analysis 1.1 **Follow up** Parent report measurement used: Analysis 2.1 **Meta analysis** Post intervention data reported by mother used: Analysis 3.3 Follow up data reported by mother: Analysis 4.1
Emotional and behavioural adjustment	Child problematic behaviour	Intensity	Eyberg Child Behaviour Inventory (ECBI-I)	Reported by both parents	Gross 1995	Times of measurement: at baseline, at post inter-		**Post intervention**Parent report measure-

Table 2. Outcomes and outcome measures (included studies) *(Continued)*

			(Robinson et al 1980)			vention, and at 3 months follow-up		ment used: Analysis 1.1 **Follow up** Parent report measurement used: Analysis 2.1 **Meta analysis** Post intervention data reported by mother: Analysis 3.1; Analysis 3.2 Follow up data reported by mother: Analysis 4.1
Emotional and behavioural adjustment	Child problematic behaviour	Intensity total	Eyberg Child Behaviour Inventory (ECBI-I) (Robinson et al, 1980)	Reported by parents	Gross 2003	Times of measurement: at baseline, and immediately, 6 months and 12 months after intervention,		**Post intervention**Parent report measurement used: Analysis 1.1 **Follow up** Parent report measurement used: Analysis 2.1 **Meta analysis** Post intervention data used: Analysis 3.1; Analysis 3.2 Follow up data used: Analysis 4.1
Emotional and behavioural adjustment	Child problematic behaviour	Oppositional factor	Eyberg Child Behaviour Inventory	Reported by parents	Gross 2003	Times of measurement: at base-		**Post intervention** Parent report measure-

Table 2. Outcomes and outcome measures (included studies) *(Continued)*

			(ECBI-I) (Robinson et al, 1980)			line, and immediately, 6 months and 12 months after intervention,		ment used: Analysis 1.1 **Follow up** Parent report measurement used: Analysis 2.1 **Meta analysis**: not used
Emotional and behavioural adjustment	Child problematic behaviour	Inattentive factor	Eyberg Child Behaviour Inventory (ECBI-I) (Robinson et al, 1980)	Reported by parents	Gross 2003	Times of measurement: at baseline, and immediately, 6 months and 12 months after intervention,		**Post intervention** Parent report measurement used: Analysis 1.1 **Follow up** Parent report measurement used: Analysis 2.1 **Meta analysis**: not used
Emotional and behavioural adjustment	Child problematic behaviour	Conduct factor	Eyberg Child Behaviour Inventory (ECBI-P) (Robinson et al, 1980)	Reported by parents	Gross 2003	Times of measurement: at baseline, and immediately, 6 months and 12 months after intervention,		**Post intervention** Parent report measurement used: Analysis 1.1 **Follow up** Parent report measurement used: Analysis 2.1 **Meta analysis**: not used
Emotional and behavioural adjustment	Child problematic behaviour	Problems total	Eyberg Child Behaviour Inventory (ECBI-P) (Robinson et al, 1980)	Reported by parents	Gross 2003	Times of measurement: at baseline, and immediately, 6 months and 12		**Post intervention** Parent report measurement used: Analysis 1.1 **Follow up** Par-

Table 2. Outcomes and outcome measures (included studies) *(Continued)*

						months after intervention,		ent report measurement used: Analysis 2.1 **Meta analysis** Post intervention data used: Analysis 3.3 Follow up data used: Analysis 4.2
Emotional and behavioural adjustment	Child problematic behaviour	Intensity	Eyberg Child Behaviour Inventory-I (Eyberg & Ross 1978)	Reported by parents	Nicholson 2002	Times of measurement: at baseline, at post intervention, and at 1 month follow-up		**Post intervention**Parent report measurement used: Analysis 1.1 **Follow up** data not available for both the intervention and control group **Meta analysis:** post intervention parent data used: Analysis 3.2
Emotional and behavioural adjustment	Child problematic behaviour	Conduct problem	Eyberg Child Behaviour Inventory-P (Eyberg & Ross 1978)	Reported by parents	Nicholson 2002	Times of measurement: at baseline, at post intervention, and at 1 month follow-up		**Post intervention**Parent report measurement not used: Analysis 1.1 **Follow up** data not available for both the intervention and control group

Table 2. Outcomes and outcome measures (included studies) *(Continued)*

								Meta analysis: post intervention parent data used: Analysis 3.3
Emotional and behavioural adjustment	Child problematic behaviour	Conduct problem	The home situations questionnaire (Barkley 1981)	Reported by parents	Sutton 1992	Times of measurement: at baseline, at post intervention, and at 12-18 months follow-up		**Post intervention**Parent report measurement used: Analysis 1.1 **Follow up** data not available for both the intervention and control group **Meta analysis:** not used to avoid double counting of participants; used CBQ instead
Emotional and behavioural adjustment	Child problematic behaviour	Conduct problem in the classroom	Kohns Problem Checklist (KPC) (Kohn, 1997)	Reported by teacher	Gross 2003	Times of measurement: at baseline, and immediately, 6 months and 12 months after intervention,		**Post intervention** Parent report measurement used: Analysis 1.1 **Follow up** Parent report measurement used: Analysis 2.1 **Meta analysis**: not used **Follow up**

Table 2. Outcomes and outcome measures (included studies) *(Continued)*

								meta analysis Teacher outcome measurement not used to avoid double counting of participants - used ECBI parent outcome measurement instead
Emotional and behavioural adjustment	Child problematic behaviour	Conduct problem	Pediatric Symptom Checklist (Murphy & Jellinek 1988)	Reported by parents	Nicholson 2002	Times of measurement: at baseline, at post intervention, and at 1 month follow-up		**Post intervention**Parent outcome measurement used: Analysis 1.1 **Follow up** data not available for both the intervention and control group **Meta analysis:** not used
Emotional and behavioural adjustment	Child problematic behaviour	Conduct problem	Pediatric Symptom Checklist (Murphy & Jellinek 1988)	Reported by teachers	Nicholson 2002	Times of measurement: at baseline, at post intervention, and at 1 month follow-up		**Post intervention**Teacher report used as independent observation outcome measurement: Analysis 1.1 **Follow up** data not available for both the

Table 2. Outcomes and outcome measures (included studies) *(Continued)*

								intervention and control group **Meta analysis:** Analysis 3.4
Emotional and behavioural adjustment	Child problematic behaviour	Conduct problem	Sutter-Eyberg Student Behaviour Inventory (Sutter & Eyberg 1984)	Reported by teacher	Nicholson 2002	Times of measurement: at baseline, at post intervention, and at 1 month follow-up		**Post intervention:** Analysis 1.1 **Follow up** data not available for both the intervention and control group **Meta analysis:** not used
Emotional and behavioural adjustment	Child problematic behaviour	Intensity	Sutter-Eyberg Student Behaviour Inventory (Sutter & Eyberg 1984)	Reported by teacher	Nicholson 2002	Times of measurement: at baseline, at post intervention, and at 1 month follow-up		**Post intervention:** Analysis 1.1 **Follow up** data not available for both the intervention and control group **Meta analysis:** not used
Emotional and behavioural adjustment	Child problematic behaviour	Child total deviant behaviour	Strengths and Difficulties Questionnaire (SDQ) scale (Goodman et al 2000)	Self reports by parents	Hutchings 2007	Times of measurement: at baseline, and at 6 months follow-up	The unit of randomisation was the parent-index child pair; parent involved in the study was mother or father; the reports obtained by parents have not presented sepa-	**Post intervention** assessment not performed **Follow up** Parent report measurement used: Analysis 2.1 **Meta analysis**: not used

Table 2. Outcomes and outcome measures (included studies) *(Continued)*

							rately for mothers and fathers	
Emotional and behavioural adjustment	Child problematic behaviour	Conduct problems	Eyberg Child Behaviour Inventory-Problem (ECBI-P) scale (Eyberg & Ross 2000)	Reported by parents	Hutchings 2007	Times of measurement: at baseline, and at 6 months follow-up		**Post intervention** assessment not performed **Follow up** Parent report measurement used: Analysis 2.1 **Meta analysis**: Analysis 4.2
Emotional and behavioural adjustment	Child problematic behaviour	Conduct problems	Strengths and Difficulties Questionnaire (SDQ) scale (Goodman et al 2000)	Reported by parents	Hutchings 2007	Times of measurement: at baseline, and at 6 months follow-up		**Post intervention** assessment not performed **Follow up** Parent report measurement used: Analysis 2.1 **Meta analysis**: not used
Emotional and behavioural adjustment	Child problematic behaviour	Hyperactive/ distractible	Preschool Behaviour Questionnaire (PBQ) (Behar & Stringfield 1974, modified version from Rutter 1967)	Self reports by parents (questionnaire)	Bradley 2003	Times of measurement: at baseline, and at 3 months after the orientation for both groups Note: a subset (25 out of families was assessed at follow-up (pages 1173-1174)		**Post intervention**Parent outcome measurement used: Analysis 1.1 **Follow up** data not available for both the intervention and control group **Meta analysis**: not used

Table 2. Outcomes and outcome measures (included studies) *(Continued)*

Emotional and behavioural adjustment	Child problematic behaviour	Total score (hostile/ aggressive, anxious, and hyperactive/ distractible)	Preschool Behaviour Questionnaire (PBQ) (Behar & Stringfield 1974, modified version from Rutter 1967)	Self reports by parents (questionnaire)	Bradley 2003	Times of measurement: at baseline, and at 3 months after the orientation for both groups Note: a subset of 25 families in intervention group was assessed at follow-up (pages 1173-1174)		**Post intervention**Parent outcome measurement used: Analysis 1.1 **Follow up** data not available for both the intervention and control group **Meta analysis** Post intervention data used: Analysis 3.1; Analysis 3.2; Analysis 3.3
Emotional and behavioural adjustment	Child problematic behaviour	Hyperactivity	Conners abbreviated parent/ teacher rating scale (Conners 1994)	Self reports by parents	Hutchings 2007	Times of measurement: at baseline, and at 6 months follow-up		**Post intervention** assessment not performed **Follow up** Parent report measurement used: Analysis 2.1 **Meta analysis**: not used
Emotional and behavioural adjustment	Child problematic behaviour	Hyperactivity	Strengths and Difficulties Questionnaire (SDQ) scale (Goodman et al 2000)	Self reports by parents	Hutchings 2007	Times of measurement: at baseline, and at 6 months follow-up		**Post intervention** assessment not performed **Follow up** Parent report measurement used: Analysis 2.1 **Meta analysis**: not used

Table 2. Outcomes and outcome measures (included studies) *(Continued)*

Emotional and behavioural adjustment	Child problematic behaviour	Intensity	Eyberg Child Behaviour Inventory-Intensity (ECBI-I) scale (Eyberg & Ross 2000)	Self reports by parents	Hutchings 2007	Times of measurement: at baseline, and at 6 months follow-up		**Post intervention** assessment not performed **Follow up** Parent report measurement used: Analysis 2.1 **Meta analysis**: Analysis 4.1
Emotional and behavioural adjustment	Child problematic behaviour	Self control	Kendal self control rating scale (Kendal & Wilcox 1979)	Self reports by parents	Hutchings 2007	Times of measurement: at baseline, and at 6 months follow-up		**Post intervention** assessment not performed **Follow up** Parent report measurement used: Analysis 2.1 **Meta analysis**: not used
Emotional and behavioural adjustment	**Child temperament**	Difficultness and unstoppability	Preschool Characteristics Questionnaire (PCQ) (Finegan et al1989, modified from Lee & Bates, 1985)	Parent self report (questionnaire)	Bradley 2003	Times of measurement: at baseline, and at 3 months after the orientation for both groups Note: a subset (25 out of families was assessed at follow-up (pages 1173-1174)		**Post intervention**Parent outcome measurement used: Analysis 1.1 **Follow up** data not available for both the intervention and control group **Meta analysis:** not used
Emotional and behavioural	Child temperament	Negative adaptation and af-	Preschool Characteristics Ques-	Parent self report (ques-	Bradley 2003	Times of measurement:		**Post intervention**Parent

Table 2. Outcomes and outcome measures (included studies) *(Continued)*

adjustment		fect	tionnaire (PCQ) (Finegan et al1989, modified from Lee & Bates, 1985)	tionnaire)		at baseline, and at 3 months after the orientation for both groups Note: a subset (25 out of families was assessed at follow-up (pages 1173-1174)		outcome measurement used: Analysis 1.1 **Follow up** data not available for both the intervention and control group **Meta analysis**: not used
Emotional and behavioural adjustment	Child temperament	Difficult	Preschool Characteristics Questionnaire (PCQ) (Finegan et al1989, modified from Lee & Bates, 1985)	Parent self report (questionnaire)	Bradley 2003	Times of measurement: at baseline, and at 3 months after the orientation for both groups Note: a subset (25 out of families was assessed at follow-up (pages 1173-1174)		**Post intervention**Parent outcome measurement used: Analysis 1.1 **Follow up** data not available for both the intervention and control group **Meta analysis**: not used
Emotional and behavioural adjustment	Child temperament	Regularity of biological functioning, approach/ withdrawal, adaptability Intensity of affect expression, quality of mood	Toddler Temperament Scale (Chess & Thomas 1986)	Reported by both parents	Gross 1995	Times of measurement: at baseline, at post intervention, and at 3 months follow-up		**Post intervention**Parent report measurement used: Analysis 1.1 **Follow up** Parent report measurement used: Analysis 2.1

Table 2. Outcomes and outcome measures (included studies) *(Continued)*

								Meta analysis: not used to avoid double counting of participants; used ECBI instead
Emotional and behavioural adjustment	**Parent/ child interaction**	Child deviant behaviour Measured: Command-compliance Command-non compliance Deviant behaviour	Dyadic Parent-Child Interacting Coding System (DPICS) (Robinson & Eyberg 1981)	Videotaped (through one way glass) three five minute sessions of semi structure activity including child directed play, parent directed play and clearing up Obtained by the assessors (Principal Investigator)	Cummings 2000	Times of measurement: The abstract states that testing was carried out at baseline, at post-intervention, and at 4-week follow-up. However, Table 2 (page 42) suggests that DPICS was carried out at post-intervention (at the end of training) only	For child behaviours only deviant behaviours and compliance or non compliance with parent's commands were recorded	**Post intervention**Post intervention independent measurement not used: Mean reported in percentages (Mean %) **Follow up** Follow up data not performed **Meta analysis**: not used
Emotional and behavioural adjustment	Parent/child interaction	Child deviance	Dyadic parent-child interaction coding system (DPICS) (Eyberg & Robinson 1981)	Direct observation in participant's home by observers	Hutchings 2007	Times of measurement: at baseline, and at 6 months follow-up		**Post intervention** assessment not performed **Follow up** Parent report measurement used: Analysis 2.1 **Meta analysis**: Analysis 4.3

Table 2. Outcomes and outcome measures (included studies) *(Continued)*

Emotional and behavioural adjustment	Parent/child interaction	Child negative behaviour (one composite score: Total number of whines, cries, physical negatives directed at the parent, "smart talk", destructive behaviours, and non-compliance to parental commands.	Dyadic Parent-Child Interactive Coding System (DPICS) (Robinson & Eyberg 1992)	Observational measure: 15 minutes video-taped parent-child free play session in participants' home Obtained by trained assessors	Gross 1995	Times of measurement: at baseline, at post intervention, and at 3 months follow-up		**Post intervention**Independent observer measurement for both parents used: Analysis 1.1 **Follow up** Independent observer measurement for both parents used: Analysis 2.1 **Meta analysis** Post intervention data for mother used: Analysis 3.4 Follow up data for mother used: Analysis 4.3
Emotional and behavioural adjustment	Parent/child interaction	Negative child behaviour: Child non compliance, destructive behaviour, physically negative behaviour, crying, whining, yelling and "smart talk"	Dyadic Parent-Child Interactive Coding System-Revised (DPICS-R) (no reference provided)	Observational measure: the video-taped parent-child free play	Gross 2003	Times of measurement: at baseline, and immediately, 6 months and 12 months after intervention		**Post intervention** Parent report measurement used: Analysis 1.1 **Follow up** Parent report measurement used: Analysis 2.1 **Meta analysis** Post intervention data used: Analysis 3.4

Table 2. Outcomes and outcome measures (included studies) (*Continued*)

								Follow up data used: Analysis 4.3

APPENDICES

Appendix 1. Search strategies (previous version of review)

Search strategies used in previous version of this review.
The following electronic databases were searched:
1. Biomedical sciences databases
- MEDLINE Journal articles (1970 to 2001)
- EMBASE (1974 to 2001)
- Biological Abstracts (1985 to 2001)
- British Nursing Index (1994 to 2001)

2. Social Science and General Reference databases:
- CINAHL (1982 to 2001)
- PsycINFO Journal Articles and Chapter/Books (1970 to 2001)
- Sociological Abstracts (1963 to 2001)
- Social Science Citation Index (1994 to 2001)
- ASSIA

3. Other sources of information:
- The Cochrane Library including Cochrane Database of Systematic Reviews; Cochrane Controlled Trials Register and Database of Abstracts of Reviews of Effectiveness (Issue 3, 2001)
- National Research Register (NRR) (Issue 4, 2001)
- Dissertation Abstracts (International A) (1980 to 2001)
- ERIC
- Reference lists of articles identified through database searches were examined to identify further relevant studies.
- Bibliographies of systematic and non-systematic review articles were also examined to identify relevant studies.

Potentially relevant papers that were identified in Dissertation Abstracts were only retrieved if they were available in the UK. This reflects the fact that the cost of accessing international dissertations was prohibitive.
The search terms were adapted for use in the different databases. No methodological terms were included to ensure that all relevant papers were retrieved. The following search terms were used:
1. (parent* training or parent* program* or parent* education
2. (toddler or infant or preschool or pre-school or pre school or baby or babies)
3. #1 and #2

Appendix 2. Search strategies (updated version of this review)

British Nursing Index

((parent* promotion OR parent* training OR parent* education OR parent* program*) AND (infant* OR baby OR babies OR toddler* OR pre-school* OR preschool*))

Dissertation Abstracts (searched through Proquest Dissertations & Theses)

(parent* PRE/1 promotion) OR (parent* PRE/1 training) OR (parent* PRE/1 education) OR (parent* PRE/1 program*) AND (infant* OR baby OR babies OR toddler* OR pre-school* OR preschool*)

Sociological Abstracts (through CSA)

(toddler* or infant* or preschool* or pre-school* or baby or
babies) and (((parent* training) or (parent* program*) or (parent*
education)) or (parent* promotion))

ASSIA (through CSA)

(toddler* or infant* or preschool* or pre-school* or baby or
babies) and (((parent* training) or (parent* program*) or (parent*
education)) or (parent* promotion))

CINAHL (through OVID)

1 (parent$ training or parent$ program or parent$ education or parent$ promotion).mp. [mp=title, subject heading word, abstract, instrumentation]
2 (parent$ training or parent$ program or parent$ education or parent$ promotion).tw.
3 exp Infant/
4 (baby or babies or toddler$ or infant$ or preschool$ or pre-school$).tw.
5 3 or 4
6 2 and 5

EMBASE (through OVID)

1 (parent$ training or parent$ program or parent$ education or parent$ promotion).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name]
2 (parent$ training or parent$ program or parent$ education or parent$ promotion).tw.
3 exp Infant/
4 (baby or babies or toddler$ or infant$ or preschool$ or pre-school$).tw.
5 3 or 4
6 2 and 5

MEDLINE (through OVID)

1 (parent$ training or parent$ program or parent$ education or parent$ promotion).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
2 (parent$ training or parent$ program or parent$ education or parent$ promotion).tw.
3 exp Infant/
4 (baby or babies or toddler$ or infant$ or preschool$ or pre-school$).tw.
5 3 or 4
6 2 and 5

PsycINFO (through SilverPlatter)

#5 (("Parent-Training" in MJ,MN) or ((parent* training) or (parent* program*) or (parent* education) or (parent* promotion))) and (toddler* or infant* or preschool* or pre-school* or baby or babies)
#4 ("Parent-Training" in MJ,MN) or ((parent* training) or (parent* program*) or (parent* education) or (parent* promotion))
#3 toddler* or infant* or preschool* or pre-school* or baby or babies
#2 "Parent-Training" in MJ,MN
#1 (parent* training) or (parent* program*) or (parent* education) or (parent* promotion)

COCHRANE LIBRARY (CENTRAL) and NRR

#1 (parent* next training or parent* next program* or parent* next education or parent* next promotion)
#2 (toddler* or infant* or preschool* or pre-school* or baby or babies)
#3 (#1 AND #2)

BIOSIS (Biological Abstracts) and Social Science Citation Index (through Web of Knowledge)

#7 #6 AND #5
#6 TS=(toddler* or infant* or preschool* or pre-school or baby or babies)
#5 #4 OR #3 OR #2 OR #1
#4 TS=(parent* SAME promotion)
#3 TS=(parent* SAME education)
#2 TS=(parent* SAME program*)
#1 TS=(parent* SAME training)

Appendix 3. Results of the search strategies (updated review)

Cochrane Library (CENTRAL) 2007 (Issue 4) - 134 records
MEDLINE 2001 to Nov 2007 - 324 records
EMBASE 2001 to 2007 week 48 - 194 records
BIOSIS 2001 to Nov 2007 - 357 records
National Research Record (NRR) - 2007 (Issue 4) - 46 records
ERIC 2001 to Nov 2007 - 938 recordsSocial Science Citation Index (SSCI) 2001 to Nov 2007 - 627 records
ASSIA 2001 to Nov 2007 - 57 records
Sociological Abstracts 2001 to Nov 2007 - 101 records found
PsycINFO 2001 to 2007/11 week 5 - 298 records
CINAHL 2001 to Nov week 5 2007 - 154 records
British Nursing Index 2001 to may 2008 - 19 records
Dissertation Abstracts 2001 to May 2008 - 115 records

Appendix 4. Eligibility form

Study eligibility form
Group-based parent training programmes for improving emotional and behavioural adjustment in 0-3 year old children (D0026)
Study ID: Reviewer: Final decision:
Answer all questions

Type of study		
Q1. Is the study described as randomised or quasi randomised?	Yes Unclear No	Go to next question Go to next question **Exclude**

Participants in the study		
Q2. Were the participants parents of 0-3 years old children? OR Where the participants parents of children who were slightly older than 0-3 years (up to 5 years), providing that ***the mean age*** of all children was under **3 years and 11 months**.	Yes Unclear No	Go to next question Go to next question **Exclude**
Q3. Where the participants parents of children with specific condition other than emotional and behavioural problems (e.g. physical disabilities; autism, etc.)?	Yes Unclear No	**Exclude** Go to next question Go to next question

Design of the study		
Q4. Did the study contain a control group which was either: a waiting list control, or a no-treatment control a placebo control, or a TAU (or a normal service provision) control	Yes Unclear No	Go to next question Go to next question **Exclude**
Interventions in the study		
Q5. Was the intervention group-based? N.B. Any theoretical framework including Behavioural, Family System, Psychodynamic, etc is acceptable	Yes Unclear No	Go to next question Go to next question **Exclude**
Q6. Did the intervention focus on the improvement , or prevention of emotional and behavioural problems?	Yes Unclear No	Go to next question Go to next question **Exclude**

(*Continued*)

Outcomes		
Q7. Are the following outcomes reported? Emotional and behaviour adjustment (such as successfully decreased: tantrums, self-destructive behaviours, verbal aggression, excessive crying, thumb-sucking, sleep problems, etc)	Yes Unclear No	Go to next question Go to next question **Exclude**
Q8. Did study include at least one standardised instrument measuring the above outcomes?	Yes Unclear No	Go to next question Go to next question **Exclude**
Comments / other reasons for exclusion		

Appendix 5. Sample data extraction form

Study ID	**Initials of person extracting data**
Type of report (e.g. peer reviewed journal article, full report, brief report, letter, unpublished data)	
Language of report	
Full citation	
Design of study (e.g. controlled trial, crossover trial)	
Site of intervention (e.g. single site, multiple sites, country)	
Setting of intervention (e.g. urban, rural, mixed)	
Ethics committee approval	
Age of participants (e.g. mean, SD, range)	
Sex of participants	
Ethnicity & other demographics of participants	
Baseline characteristics	
Inclusion criteria	

(*Continued*)

Exclusion criteria

Description of intervention(s) (including control condition, placebo, treatment as usual etc)
Intervention

Duration of intervention(s)

Total number of participants randomized:

Unit of allocation

Power calculation or sample size estimate

Prospectively stated outcome(s)

Information for Risk of Bias Table

(1) Adequate sequence generation? (Was the allocation sequence adequately generated?)
Quote:
Comment:
Judgement
Unclear

(2) Allocation concealment? (Was allocation adequately concealed?)
Comment:
Judgement
Unclear

(3) Blinding? (Was knowledge of the allocated interventions adequately prevented during the study?)
a) of participants?
Comment:
Judgement : N/A
b) of personnel?
Comment: .
Judgement : N/A
c) of outcome assessors?
Comment:
Judgement : N/A

(4) Incomplete outcome data addressed? (Were incomplete outcome data adequately addressed?)
Quote:
Comment:
Judgement
No:

(5) Selective outcome reporting? (Are reports free of suggestion of selective outcome reporting?)
Comment:

(*Continued*)

Judgement Yes = adequate/low risk of bias
(6) Free of other bias? (Was study apparently free of other sources of bias?) Quote: Comment: **Judgement** Unclear

Results (1) ***Mean*** ***SD*** ***Mean*** ***SD*** ***Follow-up***
Results (2) ***Mean*** ***SD***
Results (3) - outcomes reported prospectively but not presented
ITT analysis attempted?
Need to contact the author(s)?
Authors' conclusion
Other notes:

WHAT'S NEW

Last assessed as up-to-date: 31 July 2008.

Date	Event	Description
9 May 2012	Amended	Line added to Acknowledgements section on behalf of CB

HISTORY

Protocol first published: Issue 4, 2001

Review first published: Issue 2, 2002

Date	Event	Description
24 September 2009	New search has been performed	Updated with new included studies.
24 September 2009	New citation required but conclusions have not changed	Updated, new authors.
25 June 2008	Amended	Converted to new review format.
1 November 2003	Amended	Also, in Issue 4, 2003, the result of the parent-report meta-analysis has been corrected from the previously published text from a non-significant improvement of intervention to control of -0.29 [-3.31, -1.10] to a non-significant improvement of intervention to control of -0.29 [-0.55, -0.02]
31 July 2003	Amended	Small errors in a previous version of this review were changed in Issue 3, 2003, to reflect incorrect setting of the WMD instead of the SMD statistic in the meta-analyses and to align correct results in the meta-view with incorrect ones in the text
22 November 2002	New citation required and conclusions have changed	Substantive amendment

CONTRIBUTIONS OF AUTHORS

NS: Reviewed the draft and scope of the review with the contact author of the review (JB). Searched for potential included studies from searches run by the CDPLP group, identified included studies, checked the old excluded studies and excluded newly found studies which did not fit the inclusion criteria. Managed data extraction and entry. Completed the tables of characteristics of studies, extracted data, competed risk of bias tables (RoB), extracted data for use in analysis, constructed outcomes tables, checked the existing included studies data, entered data into analysis table, set up meta-analyses, wrote up methods and results section, inserted analysis results into text, entered and checked references, attended progress meetings, responsible for working collaboratively with other authors to meet publication deadlines.

CB: Worked with all review authors to ensure that the review met publication deadlines. Contributed to the methods section, analyses, recorded outcomes for drafts of the additional tables, excluded studies table. General review and publication support.

MF: Identified potential included studies, jointly finalised list of included studies with NS, data extraction, entry of RoB data for new included studies checking data entry, consulted for analyses.

JB: Updated and wrote the background and discussion sections, edited the methods, and wrote up results, gave advice about the set up of the analyses, overall responsibility for ensuring data in the review are correct.

HJ: Constructed the RoB tables, extracted RoB data from previously included studies, checked RoB tables with NS.

DECLARATIONS OF INTEREST

None known.

SOURCES OF SUPPORT

Internal sources

- Health Services Research Unit at the University of Warwick, UK.
- Institute of Mental Health, Nottinghamshire Healthcare NHS Trust, UK.

External sources

- NHS Cochrane Collaboration Programme Grant Scheme (NIHR), UK.

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

Methods

Criteria for considering studies for this review: in this updated review we clarified the criteria for inclusion in terms of the age of the participants. The previously published version stated that children with an mean age between 0-3 years were included. We clarified this to state that the review includes children with a maximum mean age of 3 years and 11 months.

Studies were excluded where they targeted parents of children under the age of three with specific conditions other than emotional and behavioural problems (e.g. physical disabilities, autism etc.). When the protocol for this review was first published in 2001, the inclusion criteria did not state this explicitly. The first published version of the review and subsequent updates included studies which did not have participants who were disabled, and parent training programmes for children with diabilities such as attention-deficit hyperactivity disorder were covered by other Cochrane systematic reviews.

Our intention was always to evaluate studies on parent training with child participants who had no diabilities other than emotional and behavioural problems, as we felt that children with disabilities might be the focus of more targeted parent training programmes and therefore different in concept and delivery. Also, we did not envisage that children of three years or younger would be diagnosed at that age with for example autism or attention-deficit hyperactivity disorder, although children are now being diagnosed earlier with these conditions. For this update we carefully considered the implications of including studies with disabled children and decided to continue to only include trials of parent training programs for children without diabilities. However no studies that had disabled child participants were in fact excluded.

Sensitivity analyses

For the updated review, we planned to carry out sensitivity analyses to test if the findings of the meta analyses were robust, by examining the effect of variables between the studies, such as older participants, RCTs and quasi-RCTs, risk of bias. This was not explicitly described in the original version of the published review and is a departure from protocol.

NOTES

At the update in 2009, we revised the excluded studies list so that it now lists only those studies which appeared initially to fit the inclusion criteria but after examination of the abstract or full text, the study was excluded. In practice this meant that some previously excluded studies no longer appear as they did not meet any of the inclusion criteria, for example, studies that were review articles and non randomised studies. For some of the previously excluded studies we only reviewed the abstracts and where no further information was available from the abstracts we have stated that in the Characteristics of excluded studies table.

INDEX TERMS

Medical Subject Headings (MeSH)

*Infant Behavior; *Mental Health; *Parenting; *Program Evaluation; Child Behavior Disorders [*prevention & control]; Child Development; Child Rearing; Emotions; Infant, Newborn; Randomized Controlled Trials as Topic

MeSH check words

Child, Preschool; Humans; Infant